11786171 PASCAL No.: 94-0663659
Cloning an **ipt** gene from Agrobacterium tumefaciens: characterisation of **cytokinins** in derivative transgenic **plant** tissue
MCKENZIE M J; JAMESON P E; POULTER RUSSELL T M
Univ. Otago, botany dep., Dunedin, New Zealand
Journal: Plant growth regulation, **1994**, 14 (3) 217-228
Language: English

12/3,AB/138 (Item 6 from file: 144)
DIALOG(R)File 144:Pascal

11737745 PASCAL No.: 94-0605454
Transgenic tobacco **plants** that overproduce **cytokinins** show increased tolerance to exogenous auxin and auxin transport **inhibitors**
YI LI; XIANGYANG SHI; STRABALA T J; HAGEN G; GUILFOYLE T J
Univ. Missouri, dep. biochemistry, Columbia MO 65211, USA
Journal: Plant science : (Limerick), **1994**, 100 (1) 9-14
Language: English
Transgenic tobacco **plants expressing** the Agrobacterium tumefaciens **cytokinin** biosynthetic **ipt** gene under the control of an auxin-inducible SAUR (Small Auxin-Up RNA) gene promoter were used to study interactions between exogenously applied auxins or auxin transport **inhibitors** and endogenously produced **cytokinins**. The transgenic **plants** used in this study had **cytokinin** levels about 10-fold higher than non-transformed tobacco **plants**. In aseptic culture, the transgenic tobacco **plants** exhibited increased tolerance to the toxic effects of high concentrations of exogenously applied auxins. This tolerance is exemplified by increased **plant** height and fresh weight in transgenic **plants** treated with auxin compared to similarly treated non-transformed **plants**

12/3,AB/139 (Item 7 from file: 144)
DIALOG(R)File 144:Pascal

10505359 PASCAL No.: 93-0014610
Altered morphology in transgenic tobacco **plants** that overproduce **cytokinins** in specific tissues and organs
YI LI; HAGEN G; GUILFOYLE T J
Univ. Missouri, dep. biochemistry, Columbia MO 65211, USA
Journal: Developmental biology, **1992**, 153 (2) 386-395
Language: English
An auxin-inducible bidirectional promoter from the soybean SAUR gene locus was fused to a reporter gene in one direction and a **cytokinin** biosynthetic gene in the opposite direction and the **expression** of these fused genes was examined in transgenic tobacco. The Escherichia coli uidA gene, which encodes the enzymes beta -glucuronidase (GUS), was used as the reporter gene and the Agrobacterium tumefaciens **ipt** gene, which encodes the enzyme **isopentenyl transferase**, was used as the **cytokinin** biosynthetic gene

12/3,AB/140 (Item 8 from file: 144)
DIALOG(R)File 144:Pascal

08398240 PASCAL No.: 88-0398994
Expression of an Agrobacterium Ti plasmid gene involved in

cytokinin biosynthesis, is regulated by virulence loci and induced by **plant** phenolic compounds
JOHN M C; AMASINO R M
Univ. Wisonsin-Madison, coll. agricultural life sci., Madison WI 53706-1569, USA
Journal: Journal of Bacteriology, **1988**, 170 (2) 790-795
Language: ENGLISH

12/3,AB/141 (Item 1 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0232193 DBA Accession No.: 99-02294 PATENT
A new construct to **express** phytohormones in developing fruit - transgenic **plant** construction via Agrobacterium tumefaciens-mediated **isopentenyl-transferase** and tryptophan-2,3-dioxygenase gene transfer and **expression**
AUTHOR: Li Y
CORPORATE SOURCE: Manhattan, KS, USA.
PATENT ASSIGNEE: Univ.Kansas-State-Res.Found. **1998**
PATENT NUMBER: WO 9849888 PATENT DATE: 981112 WPI ACCESSION NO.: 99-034673 (9903)
PRIORITY APPLIC. NO.: US 45725 APPLIC. DATE: 970506
NATIONAL APPLIC. NO.: WO 98US9013 APPLIC. DATE: 980506
LANGUAGE: English
ABSTRACT: A DNA construct containing either an **isopentenyl-transferase** (734 amino acids) or a tryptophan-2,3-dioxygenase (EC-1.13.11.11) (241 amino acids) operably linked to an ovary or developing fruit-specific **plant-expressible** promoter (e.g GH3 (749 bp), AGL (1,051 bp) or PLE36 promoter) is new. Also claimed: an Agrobacterium tumefaciens LBA 4404-transformed transgenic **plant** e.g. tomato (Lycopersicon esculentum), cucumber (Cucumis sativus), watermelon (Citrullus lanatus), tobacco (Nicotiana tabacum), apple (Malus sp.), citrus, pear (Pyrus domestica), fig (Ficus carica), currant, muskmelon, squash, cherry (Prunus sp.), sweet potato (Ipomoea batatas), grapevine (Vitis vinifera), sugarbeet (Beta vulgaris), tea (Camellia sinensis), strawberry (Fragaria sp.), blackberry (Rubus ulmifolius), blueberry (Vaccinium sp.), raspberry (Rubus idaeus), loganberry, rose (Rosa sp.), chrysanthemum, or aubergine (Solanum melongena); a method for producing the transgenic **plant**; and a transgenic seed/embryo. The construct is used to integrate **cytokinin** /auxin biosynthesis enzymes, to produce seedless fruit in the absence of pollination. (27pp)

12/3,AB/142 (Item 2 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0220044 DBA Accession No.: 98-01641 PATENT
Vector for insertion of target gene into **plants** along with a marker gene - tobacco transgenic **plant** construction for use in crop improvement
AUTHOR: Sugita K; Uesugi M; Matsunaga E; Ebinuma H
CORPORATE SOURCE: Tokyo, Japan.
PATENT ASSIGNEE: Nippon-Paper **1997**
PATENT NUMBER: WO 9742334 PATENT DATE: 971113 WPI ACCESSION NO.: 97-558990 (9751)
PRIORITY APPLIC. NO.: JP 9780821 APPLIC. DATE: 970331
NATIONAL APPLIC. NO.: WO 97JP1569 APPLIC. DATE: 970509
LANGUAGE: JA
ABSTRACT: A new bacterium (especially Agrobacterium sp.) or virus (especially gemini virus, etc.) vector for the efficient introduction

of a target gene into **plants** contains a marker gene, preferably a gene involved in the retention of Agrobacterium tumefaciens such as a **cytokinin** synthesis gene, especially the isopentenyltransferase (**ipt**) gene from T plasmid DNA, which can be deleted before or after **expression** of the target gene by application of an external stress such as light, heat or chemical treatment. The deletion can be detected by a morphological change in the transgenic **plant** tissue. The method is useful for crop improvement, especially for tobacco (Nicotiana tabacum) In an example, plasmid pNPI206 was constructed using beta-galactosidase (EC-3.2.1.23) from plasmid pBI121 as the target gene and **ipt** as the deletable marker. The ends of the eliminable section were sequences derived from plasmid pNPI128. Plasmid pNPI206 was inserted into A. tumefaciens LBA4404 and used to transform tobacco leaves. The transformants were regenerated in the presence of acetosyringin. (44pp)

12/3,AB/143 (Item 3 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0219018 DBA Accession No.: 98-00615 PATENT
New genetic constructs for transformation of organisms, particularly **plants** - Cre-recombinase or Flp-recombinase co-**expression** with a ribozyme, antisense RNA, sense suppression RNA or **plant** growth factor biosynthetic gene, in a tobacco or potato transgenic **plant**
AUTHOR: Surin B P; de Feyter R C; Graham M W; Waterhouse P M; Keese P K ; Shahjahan A
CORPORATE SOURCE: Campbell, Australian Capital Territory, Australia; Acton, Australian Capital Territory, Australia.
PATENT ASSIGNEE: CSIRO; Univ.Australian-Nat. **1997**
PATENT NUMBER: WO 9737012 PATENT DATE: 971009 WPI ACCESSION NO.: 97-526087 (9748)
PRIORITY APPLIC. NO.: AU 969031 APPLIC. DATE: 960329
NATIONAL APPLIC. NO.: WO 97AU197 APPLIC. DATE: 970327
LANGUAGE: English
ABSTRACT: A new construct has a DNA cassette with a recombinase unit (with a Cre-recombinase or Flp-recombinase gene, terminator and 1st promoter) linked to a transgene unit (with 1 or more transgenes and 2nd promoters), flanked by 2 recombinase-binding recombination loci (e.g. lox or frt sites). The transgene may encode a ribozyme, antisense RNA, co-suppression RNA, or may be a selectable marker, reporter gene or an auxin or **cytokinin** biosynthetic gene or regulatory sequence (e.g. an **ipt** gene). An intron may be inserted to disrupt recombinase **expression**. The cassette may be **expressed** in a tobacco (Nicotiana tabacum), potato (Solanum tuberosum), sweet potato, Jerusalem artichoke, taro, yam, eucalyptus, pine, aspen, gerbera, chrysanthemum, orchid, lily, rose, fuchsia, azalea, carnation, camellia, gardenia, orange, lemon, grapefruit, tangerine, lime, apple, pear, strawberry, raspberry, loganberry, blackberry, sugarcane, banana, **plantain**, pineapple or asparagus transgenic **plant**. The construct may be used for selective removal or integration of transgenes, with tight regulation of **expression**. (84pp)

12/3,AB/144 (Item 4 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0204055 DBA Accession No.: 96-14826 PATENT
Use of senescence-associated gene promoters - gene promoter SAG12 and SAG13 and **isopentenyl-transferase** gene **expression** in transgenic **plant**, for application in delayed senescence, and

increased flower, seed, and fruit induction
AUTHOR: Amasino R M; Gan S
CORPORATE SOURCE: Madison, WI, USA.
PATENT ASSIGNEE: Wisconsin-Alumni-Res.Found. **1996**
PATENT NUMBER: WO 9629858 PATENT DATE: 961003 WPI ACCESSION NO.: 96-454877 (9645)
PRIORITY APPLIC. NO.: US 413135 APPLIC. DATE: 950329
NATIONAL APPLIC. NO.: WO 96US2313 APPLIC. DATE: 960220
LANGUAGE: English
ABSTRACT: The following are claimed: 1) a genetic construct comprising a senescence-associated gene (SAG)12 or SAG13 promoter sequence operably connected to a protein-encoding DNA sequence not natively connected to the promoter sequence; 2) a cell containing a construct as in 1); 3) a **plant** containing a construct as in 1); 4) a genetic construct comprising a SAG12 or SAG13 promoter operably linked to a DNA sequence encoding **isopentenyl-transferase** (IT, EC-2.5.1.8) which catalyzes synthesis of a **cytokinin**; 5) a transgenic **plant** with delayed senescence, comprising in it's genome, 5' to 3', a genetic construction including a senescence-associated promoter and a coding region for IT; and 6) a transgenic **plant** having delayed senescence characteristics, comprising in it's genome a foreign genetic construction which comprises 5' to 3' a senescence-specific promoter, a protein region for IT, and a transcriptional termination sequence, where the foreign gene construction is **expressed** in tissues entering senescence to delay the senescence of the **plant** tissues. Such transgenic **plants** will vegetatively grow longer, producing more flowers, seeds, or fruit. (38pp)

12/3,AB/145 (Item 5 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0199851 DBA Accession No.: 96-10031
Marker-free transgenic **plants** produced by a novel transformation method 'MAT vector system' - multi-auto-transformation vector system with a tRNA-isopentenyltransferase selectable marker and excision by homologous recombination (conference abstract)
AUTHOR: Sugita K; Yamakado M; Ebinuma H
CORPORATE AFFILIATE: Nippon-Paper-Ind.
CORPORATE SOURCE: Central Research Laboratory, Nippon Paper Industries, Co., Ltd., 5-21-1, Oji, Kita-ku, Tokyo 114, Japan.
JOURNAL: Plant Physiol. (111, 2, Suppl., 165) **1996**
ISSN: 0032-0889 CODEN: PLPHAY
CONFERENCE PROCEEDINGS: Plant Biology '96; 1996 Annual Meeting of the American Society of Plant Physiologists, San Antonio, TX, 27 July-2 August, 1996.
LANGUAGE: English
ABSTRACT: A new transformation method, multi-auto-transformation (MAT) vector system, was developed. MAT-vectors contained a chimeric 35S-**ipt** gene (tRNA-isopentenyltransferase (EC-2.5.1.8) **cytokinin** biosynthesis gene) used as the selectable marker. Transgenic shoots were identified as ESP (extreme shooty phenotype) without apical dominance. A site-specific-recombination system (plasmid pSR1) of Zygosaccharomyces rouxii was used in the MAT-vector system (plasmid pNPI132) to remove the **ipt** gene. After selection of transgenic **plants**, removal of 35S-**ipt** genes was detected by appearance of normal shoots from ESPs. In an evaluation experiment with tobacco (Nicotiana tabacum), 48 ESP lines were selected and cultured. Normal elongated shoots appeared in 10 ESPs after 2 mth, and another 19 lines after 4 mth. Shoots from these 29 lines (60%) were normally elongated and rooted. These individuals were confirmed as marker-free transgenic **plants** by DNA analysis. The 35S-**ipt** gene was used as a selectable marker to obtain marker free transgenic

plants in hybrid aspen (Populus sieboldii x Populus grandidentata). (0 ref)

12/3,AB/146 (Item 6 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0174253 DBA Accession No.: 95-01074 PATENT
Gene construct for conferring enhanced insect resistance to **plants** - Agrobacterium tumefaciens isopentenyltransferase gene **expression** in a transgenic **plant** using a potato protease-**inhibitor**-IIK promoter
AUTHOR: Smigocki A G; Neal Jr J W
PATENT ASSIGNEE: USDA **1994**
PATENT NUMBER: WO 9424848 PATENT DATE: 941110 WPI ACCESSION NO.: 94-357754 (9444)
PRIORITY APPLIC. NO.: US 54985 APPLIC. DATE: 930430
NATIONAL APPLIC. NO.: WO 94US4773 APPLIC. DATE: 940428
LANGUAGE: English
ABSTRACT: A new gene construct confers enhanced insect resistance on **plants** , and comprises a wound-inducible promoter (from a potato (Solanum tuberosum) protease-**inhibitor**-II or protease-**inhibitor**-IIK gene) fused to an isopentenyltransferase gene from Agrobacterium tumefaciens. The construct may be inserted in plasmid pBI221, plasmid pCaMVNEO, plasmid pUC19, plasmid pCMC1100 or plasmid pDG208, or a **plant** binary vector, e.g. plasmid pEND4K, plasmid pMON120, plasmid pMON200, plasmid pGA472, plasmid pKYLX4, plasmid pKYLX5, plasmid pBIN6, plasmid pBIN19, plasmid pAGS112, plasmid pAGS113 or plasmid pKYLX71 (preferred). The construct may be used to confer insect resistance on a wide variety of **plants**, including crop **plants**, fruit trees and ornamentals. In an example, a chimeric **cytokinin** biosynthetic gene was constructed by fusing a bacterium **ipt** gene from plasmid pTiB683 to the 5'-regulatory region of the potato PI-IIK gene. An EcoRI-HindIII plasmid pPI-II-**ipt** fragment was subcloned into plasmid pKYLX71 and mobilized into A. tumefaciens EHA101 (plasmid pEHA101) for infection of Nicotiana plumbaginifolia leaf disks. (25pp)

12/3,AB/147 (Item 7 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0167299 DBA Accession No.: 94-09850
Transgenic peach **plants** containing a **cytokinin** biosynthesis gene display altered growth in vitro and under greenhouse conditions - peach transgenic **plant** construction via **isopentenyl-transferase ipt** gene **expression** for increased growth and compact growth habit (conference abstract)
AUTHOR: Hammerschlag F A; Smigocki A C
CORPORATE AFFILIATE: U.S.Dept.Agr.
CORPORATE SOURCE: USDA/ARS, PSI, Plant Molecular Biology Laboratory, Beltsville, MD 20705, USA.
JOURNAL: Hortscience (29, 5, 454) **1994**
CODEN: HJHSAR
LANGUAGE: English
ABSTRACT: Peach (Prunus persica) transgenic **plants** transformed with the **ipt** gene from Agrobacterium tumefaciens strain tms328::transposon Tn5 and containing elevated levels of **cytokinins** were screened in vitro for compact growth habit on 4 different levels of benzyladenine (BA). After 9 wk in vitro, the average number of axillary shoot per **plant** for 2 of the transformants, 99-1 and 40-1, ranged from 1.5- to 6.6-fold that for the

controls on 0-30 uM BA, whereas the average fresh weight ranged from 1.1- to 3.6-fold that for the controls. 1 Of the transformants, 94-1, produced a greater number of axillary shoots only on 30 uM BA. Rooted **plants** derived through propagation from the original transformants were monitored for 30 mth in the greenhouse. The average height of transformants 94-1 and 99-1 after 6 mth in the greenhouse was 88 and 77% of controls, respectively, and after 30 mth was 90 and 75% of control, respectively. In comparison to controls, transformants exhibited a greater number of branches per m per **plant** after 6 wk, but a reduced number after 30 mth. The introduction of a **cytokinin** gene may be a useful approach to obtaining peach trees with a compact growth habit. (0 ref)

12/3,AB/148 (Item 8 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0149502 DBA Accession No.: 93-07554 PATENT
DNA construct and tuber transgenic **plant** - **cytokinin** biosynthesis **ipt** gene cloning and **expression** in potato using a plasmid pCGP275 vector for crop improvement
PATENT ASSIGNEE: Calgene **1993**
PATENT NUMBER: WO 9307272 PATENT DATE: 930415 WPI ACCESSION NO.: 93-134461 (9316)
PRIORITY APPLIC. NO.: AU 918730 APPLIC. DATE: 911003
NATIONAL APPLIC. NO.: WO 92AU528 APPLIC. DATE: 921002
LANGUAGE: English
ABSTRACT: A new DNA construct contains a **plant** promoter (e.g. chs) and a sequence (e.g. **ipt**) encoding a molecule capable of enhancing tuber **plant** **cytokinin** levels. The tuber is preferably potato (Solanum tuberosum, preferred), sugarbeet (Beta vulgaris), sweet potato (Ipomoea batatas), onion (Allium cepa), garlic (Allium sativum), artichoke (Cynara scolymus) or Dahlia sp. The construct may be contained in a prokaryote and/or eukaryote vector, capable of integration into the genome or autonomous replication, preferably plasmid pCGP275. The **ipt** gene may be developmentally regulated, and under the control of an enhancer. The DNA may be used to produce a transgenic **plant** with 1 or more of the following properties: increased endogenous **cytokinin**, tuber number and/or wt., stem diameter, height or leaf size; delayed leaf senescence; or increased leaf photosynthetic capacity, leading to increased tuber load and yield. The transgenic **plant** is produced by plasmid mobilization in Agrobacterium sp., transformation, biolistic microprojectile bombardment, microinjection or electroporation. (36pp)

12/3,AB/149 (Item 9 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0116303 DBA Accession No.: 91-03945 PATENT
Modulating endogenous **cytokinin** levels - DNA cassette construction for tomato fruit tissue-specific gene **expression** e.g. during ripening; **isopentenyl-transferase** gene cloning and **expression** in transgenic **plant**; DNA sequence
PATENT ASSIGNEE: Calgene **1991**
PATENT NUMBER: EP 409628 PATENT DATE: 910123 WPI ACCESSION NO.: 91-024190 (9104)
PRIORITY APPLIC. NO.: US 382802 APPLIC. DATE: 890719
NATIONAL APPLIC. NO.: EP 90307925 APPLIC. DATE: 900719
LANGUAGE: English
ABSTRACT: An new **expression** DNA cassette contains (in 5' to 3' direction of transcription): a developmentally regulated

transcriptional and translational initiation region; a DNA sequence encoding an enzyme in a **cytokinin** metabolic pathway, under the transcriptional control of the initiator region; and a transcriptional terminator. At least 1 of the control regions is heterologous to the **cytokinin** gene. A **plant** cell containing the DNA cassette, and a method for modification of a **plant** phenotype using the DNA cassette, are also new. The **plant** cells are preferably tomato (Lycopersicon esculentum) fruit cells. The **cytokinin** metabolic pathway is preferably a biosynthetic pathway, and the gene preferably encodes DMA-**transferase** (**isopentenyl-transferase**). The developmentally regulated initiation region is preferably from a fruit-specific promoter or an ovary tissue promoter, e.g. the 2A11, Z130 or Z70 gene. Using the DNA cassette, fruit development, properties, maturation and ripening may be controlled. Other fruits (berries, drupes, hesperidium, pepos) or legume edible portions may also be modified using the DNA cassette. (38pp)

12/3,AB/150 (Item 10 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0109794 DBA Accession No.: 90-12485
Altering **plant** morphogenesis by **plant** genetic engineering - transgenic **plant** construction; tissue-specific gene **expression**; hairy root culture and propagation (conference paper)
AUTHOR: Scmuelling T; Schell J; Spena A
CORPORATE AFFILIATE: Max-Planck-Inst.Genet.
CORPORATE SOURCE: Max-Planck-Institut fuer Zuechtungsforschung, D-5000 Koeln 30, Germany.
JOURNAL: BIOTEC-90 (131-36) **1990**
CODEN: 9999Y
LANGUAGE: English
ABSTRACT: In vivo genetic manipulation makes it possible to characterize the pleiotropic effects of gene products interacting with normal differentiation mechanisms throughout the life-cycle of a **plant**, without exogenous **plant** growth factor application or disrupting the integrity of the **plant**. Genes which alter **plant** growth and differentiation may be introduced into the **plant** gnome and their effects characterized. Exchange of regulatory regions allows altered tissue-specific gene **expression**. Agrobacterium rhizogenes hairy root culture may be grown in vitro on **plant** growth factor-free culture medium, and **plants** may be propagated. Rol gene **expression** (rolA, rolB and rolC) in **plants** from hairy root cultures has been studied in detail, and altered morphogenetic characteristics have been described. The **ipt** gene of Agrobacterium tumefaciens encodes an isopentenyltransferase which causes **cytokinin** overproduction and developmental alterations in transgenic **plants** . Better knowledge of regulatory sequences should allow a more accurate targeting of gene **expression** to specific tissues or development stages. (10 ref)

12/3,AB/151 (Item 1 from file: 434)
DIALOG(R)File 434:SciSearch(R) Cited Ref Sci

09469539 Genuine Article#: U3693 Number of References: 37
Title: ALTERATIONS OF ENDOGENOUS **CYTOKININS** IN TRANSGENIC **PLANTS** USING A CHIMERIC **ISOPENTENYL TRANSFERASE** GENE
Author(s): MEDFORD JI; HORGAN R; ELSAWI Z; KLEE HJ
Corporate Source: MONSANTO CO,PLANT MOLEC BIOL GRP,700 CHESTERFIELD VILLAGE PKWY/ST LOUIS//MO/63198; UNIV WALES UNIV COLL WALES,DEPT BOT & MICROBIOL/ABERYSTWYTH SY23 3DA/DYFED/WALES/

Journal: PLANT CELL, **1989**, V1, N4, P403-413
Language: ENGLISH Document Type: ARTICLE

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  File 143:Biol. & Agric. Index  1983-2002/Mar
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         (c) 2002 INIST/CNRS
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Bluesheet available in F415 & at URL http://library.dialog.com/bluesheets.
  File 357:Derwent Biotech Res  1982-2002/Feb w3
        (c) 2002 Thomson Derwent & ISI
*File 357: Price changes as of 1/1/02. Please see HELP RATES 357.
Derwent announces file enhancements. Please see HELP NEWS 357.
  File 434:SciSearch(R) Cited Ref Sci  1974-1989/Dec
        (c) 1998 Inst for Sci Info

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            2304  IPT
            4875  ISOPENTENYL
          252794  TRANSFERASE
      S2     793  S1 AND (IPT OR (ISOPENTENYL AND TRANSFERASE))
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Completed processing all files
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 6/3,AB/1     (Item 1 from file: 5)
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DIALOG(R)File 5:Biosis Previews(R)

08305896 BIOSIS NO.: 000043060894
CYTOKININ BIOSYNTHESIS IN DEVELOPING **ZEA-MAYS** KERNELS
AUTHOR: REINECKE D M; BRENNER M L; RUBENSTEIN I
AUTHOR ADDRESS: DEP. PLANT BIOL., UNIV. MINNESOTA, ST. PAUL, MINN. 55108.
JOURNAL: ANNUAL MEETING OF THE AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS, PITTSBURGH, PENNSYLVANIA, USA, AUGUST 1-5, 1992. PLANT PHYSIOL (BETHESDA) 99 (1 SUPPL.). 1992. 66. **1992**
CODEN: PLPHA
DOCUMENT TYPE: Meeting
RECORD TYPE: Citation
LANGUAGE: ENGLISH
1992

6/3,AB/2 (Item 2 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06666208 BIOSIS NO.: 000087108385
CYTOKININ ANTAGONIST ACTIVITY OF SUBSTITUTED PHENETHYLAMINES IN **PLANT** CELL CULTURE
AUTHOR: CHRISTOU P; BARTON K A
AUTHOR ADDRESS: AGRACETUS, 8420 UNIVERSITY GREEN, MIDDLETON, WI 53562.
JOURNAL: PLANT PHYSIOL (BETHESDA) 89 (2). 1989. 564-568. **1989**
FULL JOURNAL NAME: Plant Physiology (Bethesda)
CODEN: PLPHA
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: A series of structurally related substituted phenethylamines shows extreme toxicity toward wild-type callus tissue cultures of tobacco (Nicotiana tabacum), soybean (Glycine max), corn (**Zea mays**), and sunflower (Helianthus annuus L.), but tobacco crown gall cultures are resistant to the compounds. The essential components that result in toxicity of the phenethylamines include one aromatic hydroxyl and one primary aliphatic amino group. A series of attenuated crown gall cultures, generated by transformation of tobacco with various modified Agrobacterium strains, has been used to demonstrate that the resistance of crown galls to the phenethylamines is due to the expression in these tissues of **isopentenyl transferase**, a first step in **cytokinin** biosynthesis. The toxicity of the compounds to tissues cultures is very rapid, but can be overcome by prior exposure of the calli to exogenous **cytokinin**. Because of the relationships we have observed between **cytokinins** and these compounds, we propose that the substituted phenethylamines may represent a class of chemicals that can be used as specific probes to further an understanding of **cytokinin** metabolism in **plant** tissues.

1989

6/3,AB/3 (Item 3 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

04695286 BIOSIS NO.: 000079108415
THE BIOGENESIS OF **CYTOKININS**
AUTHOR: KLAEMBT D; HOLTZ J; HELBACH M; MAASS H
AUTHOR ADDRESS: BOTANISCHES INST. UNIV., MECKENHEIMER ALLEE 170, D-5300 BONN.
JOURNAL: BER DTSCH BOT GES 97 (1-2). 1984. 57-66. **1984**

FULL JOURNAL NAME: Berichte der Deutschen Botanischen Gesellschaft
CODEN: BEDBA
RECORD TYPE: Abstract
LANGUAGE: GERMAN

ABSTRACT: **Cytokinins**, N6-substituted adenines, their ribosides and ribotides, act on cell division and cell growth, and are known to delay senescence in leaf explants by attracting amino acids, sugars, phosphate etc. Therefore **cytokinins** should be involved in growth- and sink-regulation on fruit and storage organs. Since it is known that special tRNA of all different organisms contain these modified nucleotides the assumption arises that **cytokinins** may be products of tRNA digestion. tRNA half life in Lactobacillus acidophilus and Agrobacterium tumefaciens is 1.5 times the generation time. tRNA in primary roots of **Zea mays** and Helianthus annuus and in roots of 5 wk old Phaseolus vulgaris posses half lifes of 65 to 75 h. .DELTA.2-Isopentenyldiphosphate: tRNA-.DELTA.2-isopentenyltransferase was prepared from L. acidophilus and Z. mays root tips, caryopses, young and adult leaves. Beside tRNA, MS2-RNA, endogenous oligonucleotides, poly A and oligo A could act as substrates for the isopentenylation. The distribution of the .DELTA.2-isopentenyltranferase in corn showed the highest content related to mg protein in root tips, only 1/10 of that in growing fruits and young leaves and much less in adult leaves. Following up the radiolabeled **cytokinins** in L. acidophilus after pulse labeling with [14C]-mevalonic acid the [14CC]-**cytokinins** appeared about 3 h later than the label was incorporated into the tRNA. This is consistent with the hypothesis that tRNA are the source for the free **cytokinins**. In P. vulgaris fed [14C]-adenine to the roots by pulse labeling and followed up the [14C]-**cytokinins** in root and leaves as well as the [14C]-incorporation into tRNA and an oligonucleotide fraction and their [14C]-**cytokinin**-nucleotide content in roots. The profile of [14C]-zeatin in roots and leaves gives no hint for any direct isopentenylation of one of the A-pool derivative but is in complete agreement with the hypothesis describing the **cytokinin** production by RNA digestion. tRNA account for about 50% only. The residual sources are expected in mRNA, their poly A sequences and/or their degradation products in the form of A containing oligonucleotides.

1984

6/3,AB/4 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06611933 Genuine Article#: ZE419 Number of References: 34
Title: Phenotypic alterations and component analysis of seed yield in transgenic Brassica napus **plants** expressing the tzs gene (ABSTRACT AVAILABLE)
Author(s): Roeckel P (REPRINT) ; Oancia T; Drevet JR
Corporate Source: UNIV CLERMONT FERRAND,INRA, LAB ORG & VARIABIL GENOMES VEGETAUX, 24 AVE LANDAIS/F-63177 CLERMONT FERRAND//FRANCE/ (REPRINT); UNIV CALGARY,DEPT BIOL SCI/CALGARY/AB T2N 1N4/CANADA/; UNIV CLERMONT FERRAND,BIOL CELLULAIRE LAB, CNRS, URA 6547 GEEM/F-63177 CLERMONT FERRAND//FRANCE/
Journal: PHYSIOLOGIA PLANTARUM, **1998**, V102, N2 (FEB), P243-249
ISSN: 0031-9317 Publication date: 19980200
Publisher: MUNKSGAARD INT PUBL LTD, 35 NORRE SOGADE, PO BOX 2148, DK-1016 COPENHAGEN, DENMARK
Language: English Document Type: ARTICLE
Abstract: **Cytokinins** play an important role in **plant** development. We investigated the possibility that the nopaline Ti plasmid gene (tzs) from Agrobacterium tumefaciens could encode a protein able to participate in **plant cytokinin** production

and lead to alterations in **plant** phenotype as a result of the expression of endogenous tzs. tzs was placed under the control of a heat-inducible promoter from the **Zea mays** hsp 70 gene. The expression of this fused gene was examined in transgenic Brassica napus **plants**. The tzs gene, which encodes the enzyme dimethylallyl **transferase**, was used as a **cytokinin** biosynthetic gene. The expression of the tzs gene was monitored by RNA hybridization and analysis of **cytokinin**. content. Overproduction of **cytokinin** was observed even when the **plants** had not been heat-shocked, and the **plants** displayed a reduced root system, increased height and branching, and delayed flowering. In addition, a significant increase in seed yield was observed in the transgenic **plants**, accounted for by increased number of seeds per silique and seed weight. The results suggest that increased levels of **cytokinins**, through the expression of tzs, are correlated with growth rather than with differentiation processes.

6/3,AB/5 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06399001 Genuine Article#: YP814 Number of References: 77
Title: Role and function of **cytokinin** oxidase in **plants** (ABSTRACT AVAILABLE)
Author(s): Jones RJ (REPRINT) ; Schreiber BMN
Corporate Source: UNIV MINNESOTA,DEPT AGRON & PLANT GENET, 411 BORLAUG HALL, 1991 BUFORD CIRCLE/ST PAUL//MN/55108 (REPRINT)
Journal: PLANT GROWTH REGULATION, **1997**, V23, N1-2 (OCT), P123-134
ISSN: 0167-6903 Publication date: 19971000
Publisher: KLUWER ACADEMIC PUBL, SPUIBOULEVARD 50, PO BOX 17, 3300 AA DORDRECHT, NETHERLANDS
Language: English Document Type: ARTICLE
Abstract: **Cytokinin** oxidase (CK oxidase) is widely distributed in **plants** and is the only enzyme that has been shown unequivocally to catalyze the catabolism of specific **cytokinins** (CKs) to inactive products that lack the N-6-unsaturated side chain. Thus, the enzyme is thought to play a major role in controlling the level or species of CKs in **plant** tissues. However, despite its discovery more than 25 years ago, little attention has been given to the elucidation of its role and function in **plant** growth and development. This review seeks to bring in to context the current state of knowledge regarding the biochemical and molecular properties, regulation in undifferentiated and differentiated tissues, and recent results from studies using transgenic **plants** in an attempt to provide a more comprehensive understanding of the physiological significance of the enzyme in **plants**. Notwithstanding species, tissue and other specific differences, in general, CK oxidase appears to contribute to CK homeostasis in **plants**. However, complete clarity as to its function awaits purification of the protein to homogeneity and the ultimate development of requisite molecular probes.

6/3,AB/6 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06398996 Genuine Article#: YP814 Number of References: 116
Title: **Cytokinin** conjugation: recent advances and patterns in **plant** evolution (ABSTRACT AVAILABLE)
Author(s): Auer CA (REPRINT)
Corporate Source: UNIV CONNECTICUT,DEPT PLANT SCI/STORRS//CT/06269 (REPRINT)
Journal: PLANT GROWTH REGULATION, **1997**, V23, N1-2 (OCT), P17-32

number per ear at maturity by up to 30% and in some cases the total kernel weight per ear. The increase was due to a reduction in apical kernel abortion.

6/3,AB/8 (Item 5 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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04047799 Genuine Article#: QK335 Number of References: 29
Title: INCREASE OF ENDOGENOUS ZEATIN RIBOSIDE BY INTRODUCTION OF THE **IPT** GENE IN WILD-TYPE AND THE LATERAL SUPPRESSOR MUTANT OF TOMATO (Abstract Available)
Author(s): GROOT SPC; BOUWER R; BUSSCHER M; LINDHOUT P; DONS HJ
Corporate Source: CTR PLANT BREEDING & REPROD RES,CPRO,DLO,DEPT DEV BIOL,POB 16/6700 AA WAGENINGEN//NETHERLANDS/; CTR PLANT BREEDING & REPROD RES,CPRO,DLO,DEPT VEGETABLE & FRUIT CROPS/6700 AA WAGENINGEN//NETHERLANDS/
Journal: PLANT GROWTH REGULATION, **1995**, V16, N1 (JAN), P27-36
ISSN: 0167-6903
Language: ENGLISH Document Type: ARTICLE
Abstract: We studied axillary meristem formation of the lateral suppressor (ls) mutant of tomato after elevating the endogenous **cytokinin** levels through introduction of the isopentenyltransferase (**ipt**) gene from Agrobacterium tumefaciens. Growth and development of several transformants were examined during in vitro culture. Transformants exhibited phenotypes varying in severity and were divided into four classes. A number of the **ipt** transformants had a normal phenotype, as non-transformed **plants**. Others showed a mild to severe '**cytokinin**-like' phenotype. Transformants with a mild phenotype exhibited reduced internode length and reduced root development. Transformants with a severe phenotype showed even shorter internodes, loss of apical dominance, reduction of leaf size, production of callus at the basis of the shoots and absence of root development or development of green non-branching roots. The severity of the phenotype correlated well with the level of **ipt** gene expression, as measured by northern analysis. Transformants with a severe phenotype also exhibited increased levels of zeatin riboside, but zeatin levels were not elevated. The increase in endogenous zeatin riboside levels in the ls mutant did not restore axillary meristem formation, but sometimes bulbous structures were formed in the initially 'empty' leaf axils. Several adventitious meristems and shoots developed from below the surface of these structures. It is concluded that a reduced level of **cytokinins** in the ls mutant shoots is not responsible for the absence of axillary meristem formation.

6/3,AB/9 (Item 6 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

03927116 Genuine Article#: QT551 Number of References: 40
Title: THE EFFECT OF AUXIN ON **CYTOKININ** LEVELS AND METABOLISM IN TRANSGENIC TOBACCO TISSUE EXPRESSING AN **IPT** GENE (Abstract Available)
Author(s): ZHANG R; ZHANG X; WANG J; LETHAM DS; MCKINNEY SA; HIGGINS TJV
Corporate Source: AUSTRALIAN NATL UNIV,COOPERAT RES CTR PLANT SCI,POB 475/CANBERRA/ACT 2601/AUSTRALIA/; AUSTRALIAN NATL UNIV,COOPERAT RES CTR PLANT SCI/CANBERRA/ACT 2601/AUSTRALIA/; AUSTRALIAN NATL UNIV,RES SCH BIOL SCI,PLANT CELL BIOL GRP/CANBERRA/ACT 2601/AUSTRALIA/; CSIRO,DIV PLANT IND/CANBERRA/ACT 2601/AUSTRALIA/
Journal: PLANTA, **1995**, V196, N1 (MAR), P84-94
ISSN: 0032-0935
Language: ENGLISH Document Type: ARTICLE
ISSN: 0167-6903 Publication date: 19971000
Publisher: KLUWER ACADEMIC PUBL, SPUIBOULEVARD 50, PO BOX 17, 3300 AA DORDRECHT, NETHERLANDS
Language: English Document Type: REVIEW
Abstract: **Cytokinin** (CK) conjugates are important in **plant** development because they regulate active CK concentrations, CK transport, storage, and irreversible inactivation. While numerous CK conjugates have been identified in higher **plants**, the biological functions of these compounds, their location within cells and tissues, and the enzymes and genes involved in their regulation are not clearly understood. In this paper, recent advances are reported which have occurred through the study of transgenic **plants** containing the **ipt** or rolC genes, the identification of new regulatory enzymes affecting CKs, and the characterization of new CK conjugates. In addition, a survey of the literature is presented which examines the pattern of CK conjugates found in different **plant** taxa. Based on current knowledge, it appears that green algae, mosses, and ferns contain relatively few CK conjugates of isopentenyl adenine (iP) and zeatin (Z). In contrast, higher land **plants**, such as gymnosperms and angiosperms, contain a more complex set of CKs, primarily conjugates of Z and dihydrozeatin (DHZ). This suggests that the pattern of CK conjugation has become more complex in parallel with the increasing complexity of higher **plants**.

6/3,AB/7 (Item 4 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

04063789 Genuine Article#: RB577 Number of References: 52
Title: CHANGES IN **CYTOKININS** AND **CYTOKININ** OXIDASE ACTIVITY IN DEVELOPING MAIZE KERNELS AND THE EFFECTS OF EXOGENOUS **CYTOKININ** ON KERNEL DEVELOPMENT (Abstract Available)
Author(s): DIETRICH JT; KAMINEK M; BLEVINS DG; REINBOTT TM; MORRIS RO
Corporate Source: UNIV MISSOURI,DEPT BIOCHEM,117 SCHWEITZEL HALL/COLUMBIA//MO/65211; UNIV MISSOURI,DEPT BIOCHEM/COLUMBIA//MO/65211; ACAD SCI CZECH REPUBL,INST EXPTL BOT/CR-16630 PRAGUE 6//CZECH REPUBLIC/ ; UNIV MISSOURI,DEPT AGRON/COLUMBIA//MO/65211
Journal: PLANT PHYSIOLOGY AND BIOCHEMISTRY, **1995**, V33, N3 (MAY-JUN) , P327-336
ISSN: 0981-9428
Language: ENGLISH Document Type: ARTICLE
Abstract: Temporal changes in **cytokinin** levels, mitotic activity and **cytokinin** oxidase activity were determined within kernels at the same stage of physiological development in single ears of field-grown maize (**Zea mays** L.). **Cytokinins** were qualitatively and quantitatively characterized by immunoaffinity chromatography, high-performance liquid chromatography (HPLC) and radioimmunoassay (RIA). Zeatin (Z), zeatin riboside (ZR) and isopentenyladenosine (iPA) all reached their maximum concentrations 9 days after pollination (DAP). The mitotic activity within the endosperm also peaked at 9 DAP. **Cytokinin** oxidase was present in kernels at basal levels from 3-6 DAP, then increased substantially through 10 DAP. Comparison of oxidase activity in kernels which are maturing normally and those which will abort, revealed major differences. In aborting apical kernels, the enzyme activity remained at basal levels from 4-10 DAP and only increased slightly trough 15 DAP. In median kernels, which develop normally, oxidase activity increased significantly by 5 DAP and reached a peak 4-fold higher than the basal level by 9 DAP. The differences in **cytokinin** oxidase activity between kernels which are maturing normally and those which will abort was so pronounced that **cytokinin** oxidase levels can be considered an indicator of normal kernel development. Stem infusion of benzylaminopurine (BA), but not Z or ZR, into intact **plants** at pollination increased the kernel

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DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04063789 Genuine Article#: RB577 Number of References: 52
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Journal: PLANT PHYSIOLOGY AND BIOCHEMISTRY, **1995**, V33, N3 (MAY-JUN) , P327-336
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number per ear at maturity by up to 30% and in some cases the total kernel weight per ear. The increase was due to a reduction in apical kernel abortion.

6/3,AB/8 (Item 5 from file: 34)
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04047799 Genuine Article#: QK335 Number of References: 29
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Author(s): GROOT SPC; BOUWER R; BUSSCHER M; LINDHOUT P; DONS HJ
Corporate Source: CTR PLANT BREEDING & REPROD RES,CPRO,DLO,DEPT DEV BIOL,POB 16/6700 AA WAGENINGEN//NETHERLANDS/; CTR PLANT BREEDING & REPROD RES,CPRO,DLO,DEPT VEGETABLE & FRUIT CROPS/6700 AA WAGENINGEN//NETHERLANDS/
Journal: PLANT GROWTH REGULATION, **1995**, V16, N1 (JAN), P27-36
ISSN: 0167-6903
Language: ENGLISH Document Type: ARTICLE
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6/3,AB/9 (Item 6 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03927116 Genuine Article#: QT551 Number of References: 40
Title: THE EFFECT OF AUXIN ON **CYTOKININ** LEVELS AND METABOLISM IN TRANSGENIC TOBACCO TISSUE EXPRESSING AN **IPT** GENE (Abstract Available)
Author(s): ZHANG R; ZHANG X; WANG J; LETHAM DS; MCKINNEY SA; HIGGINS TJV
Corporate Source: AUSTRALIAN NATL UNIV,COOPERAT RES CTR PLANT SCI,POB 475/CANBERRA/ACT 2601/AUSTRALIA/; AUSTRALIAN NATL UNIV,COOPERAT RES CTR PLANT SCI/CANBERRA/ACT 2601/AUSTRALIA/; AUSTRALIAN NATL UNIV,RES SCH BIOL SCI,PLANT CELL BIOL GRP/CANBERRA/ACT 2601/AUSTRALIA/; CSIRO,DIV PLANT IND/CANBERRA/ACT 2601/AUSTRALIA/
Journal: PLANTA, **1995**, V196, N1 (MAR), P84-94
ISSN: 0032-0935
Language: ENGLISH Document Type: ARTICLE

Abstract: The **ipt** gene from the T-DNA Agrobacterium tumefaciens was transferred to tobacco (Nicotiana tabacum L.) in order to study the control which auxin appears to exert over levels of **cytokinin** generated by expression of this gene. The transgenic tissues contained elevated levels of **cytokinins**, exhibited **cytokinin** and auxin autonomy and grew as shooty calli on hormone-free media. Addition of 1-naphthylacetic acid to this culture medium reduced the total level of **cytokinins** by 84% while 6-benzylaminopurine elevated the **cytokinin** level when added to media containing auxin. The **cytokinins** in the transgenic tissue were labelled with H-3 and auxin was found to promote conversion of zeatin-type **cytokinins** to H-3-labelled adenine derivatives. When the very rapid metabolism of exogenous [H-3]zeatin riboside was suppressed by a phenylurea derivative, a noncompetitive inhibitor of **cytokinin** oxidase, auxin promoted metabolism to adenine-type compounds. Since these results indicated that auxin promoted **cytokinin** oxidase activity in the transformed tissue, this enzyme was purified from the tobacco tissue cultures. Auxin did not increase the level of the enzyme per unit tissue protein, but did enhance the activity of the enzyme in vitro and promoted the activity of both glycosylated and non-glycosylated forms. This enhancement could contribute to the decrease in **cytokinin** level induced by auxin. Studies of **cytokinin** biosynthesis in the transgenic tissues indicated that transhydroxylation of isopentenyladenine-type **cytokinins** to yield zeatin-type **cytokinins** occurred principally at the nucleotide level.

6/3,AB/10 (Item 7 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03826016 Genuine Article#: QH874 Number of References: 164
Title: MOLECULAR-GENETICS OF AUXIN AND **CYTOKININ**
Author(s): HOBBIE L; TIMPTE C; ESTELLE M
Corporate Source: INDIANA UNIV,DEPT BIOL/BLOOMINGTON//IN/47405; INDIANA UNIV,DEPT BIOL/BLOOMINGTON//IN/47405
Journal: PLANT MOLECULAR BIOLOGY, **1994**, V26, N5 (DEC), P1499-1519
ISSN: 0167-4412
Language: ENGLISH Document Type: REVIEW

6/3,AB/11 (Item 8 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03826015 Genuine Article#: QH874 Number of References: 113
Title: **CYTOKININ** METABOLISM - IMPLICATIONS FOR REGULATION OF **PLANT**-GROWTH AND DEVELOPMENT
Author(s): BRZOBOHATY B; MOORE I; PALME K
Corporate Source: ACAD SCI CZECH REPUBL,INST BIOPHYS,KRALOVOPOLSKA 135/CR-61265 BRNO//CZECH REPUBLIC/; ACAD SCI CZECH REPUBL,INST BIOPHYS/CR-61265 BRNO//CZECH REPUBLIC/; UNIV OXFORD,DEPT PLANT SCI/OXFORD OX1 3RB//ENGLAND/
Journal: PLANT MOLECULAR BIOLOGY, **1994**, V26, N5 (DEC), P1483-1497
ISSN: 0167-4412
Language: ENGLISH Document Type: REVIEW

6/3,AB/12 (Item 9 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03731546 Genuine Article#: QB247 Number of References: 46

Title: STUNTED-**PLANT**-1, A GENE REQUIRED FOR EXPANSION IN RAPIDLY ELONGATING BUT NOT IN DIVIDING CELLS AND MEDIATING ROOT-GROWTH RESPONSES TO APPLIED **CYTOKININ** (Abstract Available)
Author(s): BASKIN TI; CORK A; WILLIAMSON RE; GORST JR
Corporate Source: UNIV MISSOURI,DIV BIOL SCI,109 TUCKER HALL/COLUMBIA//MO/65211; AUSTRALIAN NATL UNIV,RES SCH BIOL SCI,PLANT CELL BIOL GRP/CANBERRA/ACT 2601/AUSTRALIA/; UNIV TASMANIA,DEPT PLANT SCI/HOBART/TAS 7001/AUSTRALIA/
Journal: PLANT PHYSIOLOGY, **1995**, V107, N1 (JAN), P233-243
ISSN: 0032-0889
Language: ENGLISH Document Type: ARTICLE
Abstract: To understand the control of spatial patterns of expansion, we have studied root growth in wild type and in the stunted **plant** 1 mutant, stp1, of Arabidopsis thaliana. We measured profiles of cell length and calculated the distribution of elongation rate. Slow growth of stp1 results both from a failure of dividing cell number to increase and from low elongation rates in the zone of rapid expansion. However, elongation of dividing cells was not greatly affected, and stp1 and wild-type callus grew at identical rates. Thus, rapid cellular expansion differs in mechanism from expansion in dividing cells and is facilitated by the STP1 gene. Additionally, there was no difference between stp1 and wild-type roots for elongation in response to abscisic acid, auxin, ethylene, or gibberellic acid or for radial expansion in response to ethylene; however, stp1 responded to **cytokinin** much less than wild type. In contrast, both genotypes responded comparably to hormones when explants were cultured; in particular, there was no difference between genotypes in shoot regeneration in response to **cytokinin**. Thus, effects on root expansion mediated by **cytokinin**, but not effects mediated by other hormones or effects on other **cytokinin**-mediated responses, require the STP1 locus.

6/3,AB/13 (Item 10 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02861394 Genuine Article#: MK413 Number of References: 26
Title: MORPHOMETRIC ANALYSIS OF THE GROWTH OF PHSP70-**IPT** TRANSGENIC TOBACCO **PLANTS** (Abstract Available)
Author(s): VANLOVEN K; BEINSBERGER SEI; VALCKE RLM; VANONCKELEN HA; CLIJSTERS HMM
Corporate Source: LIMBURGS UNIV CENTRUM,DEPT SBG,UNIV CAMPUS/B-3610 DIEPENBEEK//BELGIUM/; LIMBURGS UNIV CENTRUM,DEPT SBG,UNIV CAMPUS/B-3610 DIEPENBEEK//BELGIUM/; UNIV INSTELLING ANTWERP,DEPT BIOL/B-2610 WILRIJK//BELGIUM/
Journal: JOURNAL OF EXPERIMENTAL BOTANY, **1993**, V44, N268 (NOV), P 1671-1678
ISSN: 0022-0957
Language: ENGLISH Document Type: ARTICLE
Abstract: The effect of introducing a supplementary **ipt**-gene into the genome of Nicotiana tabacum L. cv. Petit Havana SR1 is studied on the morphological **plant** development. The **ipt**-gene, accounting for the biosynthesis of **cytokinins**, was coupled to the heat-inducible hsp70- promoter from Drosophila melanogaster. Besides the influence of the hormonal changes involved, the effects of the experimental conditions are examined, namely the in vitro growth conditions for selecting transformed **plants** and the heat treatment to induce **ipt**-gene expression.

The phenotype of the **plants** is determined by the tissue sensitivity to three factors: (1) heat treatment reduces stem elongation and diameter growth; (2) in vitro pre-cultivation also reduces stem elongation; and (3) expression of the **ipt**-gene stimulates diameter growth, induces debudding of the axillary shoots

and inhibits root development. In addition, axillary bud development indicates that in vitro cultivation affects **ipt**-gene expression.

6/3,AB/14 (Item 1 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02762279 CAB Accession Number: 931642994
Floral development and expression of floral homeotic genes are influenced by **cytokinins**.
Estruch, J. J.; Granell, A.; Hansen, G.; Prinsen, E.; Redig, P.; Onckelen, H. van; Schwarz-Sommer, Z.; Sommer, H.; Spena, A.
Max-Planck-Institut fur Zuchtungsforschung, Carl-von-Linne-Weg 10, 5000 Koln 30, Germany.
Plant Journal vol. 4 (2): p.379-384
Publication Year: 1993
ISSN: 0960-7412 --
Language: English
Document Type: Journal article
Tobacco **plants** that are somatic mosaics for the expression of a **cytokinin**-synthesizing gene (**isopentenyl transferase**) have viviparous leaves and were obtained by inserting the maize transposon Ac into the untranslated leader sequence of the 35S-**ipt** gene. Epiphyllous buds can be either vegetative or floral. Floral adventitious buds can be either normal or abnormal. Abnormalities of floral development correlate with: (1) a local activation of the **cytokinin**-synthesizing gene; (2) a drastic increase in floral **cytokinin** content; and (3) a decrease in the steady-state levels of mRNA homologues of the homeotic genes DEFA, GLO and PLENA of Antirrhinum majus. Thus, these data show that **cytokinins** in **planta** are able to alter the development of floral organs and to decrease the expression of 3 homeotic floral genes. Nucleotide sequence data for the tobacco cDNA clone are deposited under EMBL Data Library accession number X67959. 29 ref.

6/3,AB/15 (Item 2 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02757131 CAB Accession Number: 930767659
Control of **cytokinin** levels by inhibitors of metabolism, symbiosis and genetic manipulation.
Hocart, C. H.; Letham, D. S.; Wang, J.; Cornish, E.; Parker, C. W.
Research School of Biological Sciences, Australian National University, Canberra, ACT 2601, Australia.
Conference Title: Progress in plant growth regulation. Proceedings of the 14th international conference on plant growth substances, Amsterdam, 21-26 July, 1991
p.607-616
Publication Year: 1992
Editors: Karssen, C. M.; Loon, L. C. van; Vreugdenhil, D.
Publisher: Kluwer Academic Publishers -- Dordrecht, Netherlands
ISBN: 0-7923-1617-7
Language: English
Document Type: Conference paper
A review and discussion on increasing **cytokinin** levels either indirectly by inhibiting **cytokinin** N-glucosylation and alanine conjugation in radishes, maize, oats and soyabeans, or directly by increasing the level of **cytokinins** either by the incorporation of the **cytokinin** biosynthetic gene (**ipt**) into the **plant** genome to increase the production of N6-(isopent-2-enyl)adenosine-5'-phosphate, or through the mediation of a symbiotic relationship, such as between a **cytokinin** -overproducing strain of Rhizobium and

pigeonpeas. 23 ref.

6/3,AB/16 (Item 3 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02708928 CAB Accession Number: 931638660
Viviparous leaves produced by somatic activation of an inactive **cytokinin**-synthesizing gene.
Estruch, J. J.; Prinsen, E.; Onckelen, H. van
MPI fur Zuchtungsforshchung, Carl-von-Linne Weg 10, W-5006 Koln 30, Germany.
Science (Washington) vol. 254 (5036): p.1364-1367
Publication Year: 1991
ISSN: 0036-8075 --
Language: English
Document Type: Journal article
A chimaeric gene consisting of the CaMV 35S promoter and the **isopentenyl transferase** (**ipt**) gene of Agrobacterium tumefaciens, split by the Activator element of maize, was introduced into tobacco. Tobacco **plants** that are somatic mosaics for expression of a **cytokinin**-synthesizing **ipt** gene have viviparous leaves. Such a formation of shoots in an abnormal position represents a significant deviation from the usual organization of the **plant** body where a central axis produces shoots only in the axils of lateral leaf appendages and according to a precise phyllotactic pattern. This report links vivipary to the expression of a gene whose product is involved in the synthesis of the phytohormone **cytokinin**. 27 ref.

6/3,AB/17 (Item 4 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02113494 CAB Accession Number: 891605208
Alterations of endogenous **cytokinins** in transgenic **plants** using a chimeric **isopentenyl transferase** gene.
Medford, J. I.; Horgan, R.; El-Sawi, Z.; Klee, H. J.
Pl. Molec. Biol. Group, Monsanto Co., 700 Chesterfield Village Parkway, St. Louis, MO 63198, USA.
Plant Cell vol. 1 (4): p.403-413
Publication Year: 1989
ISSN: 1040-4651 --
Language: English
Document Type: Journal article
Cytokinins appear to play an important role in the processes of **plant** development. The Agrobacterium tumefaciens **isopentenyl transferase** gene was placed under the control of a heat-inducible promoter (maize hsp70). The chimaeric gene was transferred to tobacco and Arabidopsis **plants**. Heat induction of transgenic **plants** caused the **isopentenyl transferase** mRNA to accumulate and increased the level of zeatin 52-fold, zeatin riboside 23-fold and zeatin riboside 5'-monophosphate 2-fold. At the control temperature zeatin riboside and zeatin riboside 5'-monophosphate accumulated in transgenic **plants** to levels 3 and 7 times, respectively, over levels in wild-type **plants**. This uninduced **cytokinin** increase affected various aspects of development. In tobacco these effects included release of axillary buds, reduced stem and leaf area and an underdeveloped root system. In Arabidopsis reduction of root growth was also found. However, neither tobacco nor Arabidopsis transgenic **plants** showed any differences relative to wild-type **plants** in time of flowering. Unexpectedly, heat induction of **cytokinins** in transgenic **plants** produced no changes beyond those seen in the uninduced state. The lack of effect from

heat-induced increases could be a result of the transient increases in **cytokinin** levels, direct or indirect induction of negating factor(s), or lack of a corresponding level of competent cellular factors. Overall, the effects of the increased levels of endogenous **cytokinins** in non-heat-shocked transgenic **plants** seemed to be confined to aspects of growth rather than differentiation. Since no alterations in the programmed differentiation pattern were found with increased **cytokinin** levels, it is thought that this process may be controlled by components other than absolute **cytokinin** levels. 36 ref.

6/3,AB/18 (Item 1 from file: 357)
DIALOG(R)File 357:Derwent Biotech Res

0199832 DBA Accession No.: 96-10012
MAT (Multi-Auto-Transformation) vector system 'marker-free transgenic **plants** can be visually selected by using the **IPT** gene as a positive marker - **isopentenyl-transferase ipt** gene selectable marker application in the visual selection of transgenic **plant** (conference abstract)
AUTHOR: Ebinuma H; Sugita K; Matsunaga E; Yamakado M
CORPORATE AFFILIATE: Nippon-Paper
CORPORATE SOURCE: Central Research Laboratory, Nippon Paper Industries, Co., Ltd., 5-21-1, Oji, Kita-ku, Tokyo, Japan.
email:LDW06374@niftyserve.or.jp
JOURNAL: Plant Physiol. (111, 2, Suppl., 42) **1996**
ISSN: 0032-0889 CODEN: PLPHAY
CONFERENCE PROCEEDINGS: Plant Biology '96; 1996 Annual Meeting of the American Society of Plant Physiologists, San Antonio, TX, 27 July-2 August, 1996.
LANGUAGE: English
ABSTRACT: The **ipt** gene coding for **isopentenyl-transferase** which catalyzes **cytokinin** synthesis, was used as a positive marker to select transgenic **plants**. To remove the 35S-**ipt** gene from transgenic **plants** after transformation, the gene was combined into the maize (**Zea mays**) transposable element Ac (pNPI106), or the yeast site-specific-recombination system pSR1 (pNPI132). This was termed a MAT (Multi-Auto-Transformation) vector system. Results indicated that the positive marker, the chimeric **ipt** gene, has a number of promising properties which make it an attractive alternative to the negative selectable marker genes. (1) Positive effects on cell division and differentiation of transgenic **plants** by **cytokinin**; (2) visual selection of transgenic **plants** with the chimeric **ipt** gene by morphological characteristics; (3) visual selection of marker-free transgenic **plants** without the chimeric **ipt** gene by morphological change. The MAT vector system enables the production of environmentally safe transgenic **plants** without sexual crosses and seed production, and pyramid multiple genes into a vegetatively propagated crop by repeated transformation. (0 ref)

```
  s s3 not s5 and Zea (w) mays
             541  S3
              20  S5
          281588  ZEA
          266800  MAYS
          266129  ZEA(W)MAYS
      S7       0  S3 NOT S5 AND ZEA (W) MAYS
? ds

Set      Items   Description
S1       50989   CYTOKININ?
S2         793   S1 AND (IPT OR (ISOPENTENYL AND TRANSFERASE))
S3         541   S2 AND PY<1999
S4         517   S3 AND PLANT?
S5          20   S4 AND ZEA (W) MAYS
S6          18   RD (unique items)
S7           0   S3 NOT S5 AND ZEA (W) MAYS
? s s4 and (maize or corn) not s5
             517  S4
          362301  MAIZE
          265038  CORN
              20  S5
      S8       9  S4 AND (MAIZE OR CORN) NOT S5
? rd
>>>Duplicate detection is not supported for File 235.
>>>Duplicate detection is not supported for File 306.

>>>Records from unsupported files will be retained in the RD set.
...completed examining records
      S9       6  RD (unique items)
? t s9/3,ab/all
>>>No matching display code(s) found in file(s): 65, 235, 306

 9/3,AB/1      (Item 1 from file: 5)
DIALOG(R)File   5:Biosis Previews(R)
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09042188   BIOSIS NO.: 199497050558
Cytokinins in plant pathogenic bacteria and developing cereal
  grains.
AUTHOR: Morris Roy O(a); Blevins Dale G; Dietrich Joseph T; Durley Richard
  C; Gelvin Stanton B; Gray John; Hommes Norman G; Kaminek Miroslav;
  Mathews Leslie J; et al
AUTHOR ADDRESS: (a)Dep. Biochem., Univ. Mo., Columbia, MO 65211**USA
JOURNAL: Australian Journal of Plant Physiology  20 (4-5):p621-637
1993
ISSN: 0310-7841
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Cytokinin analysis by immunoaffinity chromatography (IAC),
  high-performance liquid chromatography (HPLC) and radioimmunoassay (RIA)
  or enzyme-linked immunosorption assay (ELISA) has been used to study two
  separate topics: the role of tRNA in bacterial cytokinin
  biosynthesis and the changes in cytokinin concentration which occur
  during cereal grain development. Transfer RNA isopentenylation in the
  gall-forming plant pathogen Agrobacterium tumefaciens is encoded by
  the chromosomal miaA locus. Mutation of miaA reduces tRNA
  isopentenylation significantly and preliminary data suggest that turnover
  of isopentenylated tRNA is responsible for low level secretion of free
  N-6-isopentenyladenine (iP) by the bacteria. However, the major route of
  cytokinin biosynthesis by gall-forming plant pathogenic
  bacteria is not via tRNA turnover but by direct biosynthesis mediated by
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dimethylallylpyrophosphate: 5'-AMP transferase (DMAPP:AMP transferase) encoded by such genes as **ipt**, tzs (from A. tumefaciens) or ptz (from Pseudomonas savastanoi). Analysis of **cytokinin** levels in developing wheat and rice grains in the period immediately following pollination showed large transient increases in zeatin (Z) and zeatin riboside (ZR) which coincided with the period of maximum endosperm cell division reported by others. Detailed analyses of **maize** kernels, where development can be staged readily, showed that Z and ZR concentrations peaked 9 days after pollination (DAP). During the period 8-10 DAP, **cytokinin** oxidase underwent a significant increase in specific activity, indicating that **cytokinin** catabolism was enhanced as endosperm cell division ended.

1993

9/3,AB/2 (Item 2 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06694909 BIOSIS NO.: 000088004327
ALTERATIONS OF ENDOGENOUS **CYTOKININS** IN TRANSGENIC **PLANTS** USING A CHIMERIC ISOPENTENYLTRANSFERASE GENE
AUTHOR: MEDFORD J I; HORGAN R; EL-SAWI Z; KLEE H J
AUTHOR ADDRESS: PLANT MOL. BIOL GROUP, MONSANTO CO., 700 CHESTERFIELD VILLAGE PARKWAY, ST. LOUIS, MO. 63198.
JOURNAL: PLANT CELL 1 (4). 1989. 403-414. **1989**
FULL JOURNAL NAME: Plant Cell
CODEN: PLCEE
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Cytokins, a class of phytohormones, appear to play an important role in the processes of **plant** development. We genetically engineered the Argrobacterium tumerfaciens **isopentenyl transferase** gene, placing it under control of a heat-inducible promoter (**maize** hsp70). The chimeric hsp70 is **isopentenyl transferase** gene was transferred to tobacco and Arabidopsis **plants**. Heat induction of transgenic **plants** caused the **isopentenyl transferase** mRNA to accumulate and increase the level 52-fold, Zeatin riboside 23-fold, and Zeatin riboside 5'-monophosphate twofold. At the control temperature zeatin riboside and zeatin riboside 5'-monophosphate in transgenic **plants** accumula to levels 3 and 7 times, respectively, over levels in wild-type **plants** . This uninduced **cytokinin** increase affected various aspects of development. In tobacco, these effects included release axillary buds, reduced stem and leaf area, and an underdeveloped root system. In Arabidopsis, reduction of root growth was also found. However, neither tobacco nor Arabidopsis transgenic **plants** showed any differences relative to wild-type **plants** in time of flowering. Unexpectedly, heat induction of **cytokinins** in transgenic **plants** produced no changes beyond those seen in the uninduced state. The lack of effect from heat-induced increases could be a result of the transient increases in **cytokinin** levels, direct or indirect induction of negating factor(s), or lack of a corresponding level of competent cellular factors. Overall, the effects of the increased levels of endogenous **cytokinins** in non-heat shocked transgenic **plants** seemed to be confined to aspects of growth rather than differentiation. Since no alterations in the programmed differentiation pattern were found with increased **cytokinin** levels, this process may be controlled by components other than absolute **cytokinin** levels.

1989

9/3,AB/3 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02767288 Genuine Article#: MC821 Number of References: 37
Title: THE ROLE OF **CYTOKININ** IN ORGANIZED DIFFERENTIATION OF VASCULAR TISSUES (Abstract Available)
Author(s): ALONI R
Corporate Source: TEL AVIV UNIV,GEORGE S WISE FAC LIFE SCI,DEPT BOT/IL-69978 TEL AVIV//ISRAEL/
Journal: AUSTRALIAN JOURNAL OF PLANT PHYSIOLOGY, **1993**, V20, N4-5, P 601-608
ISSN: 0310-7841
Language: ENGLISH Document Type: ARTICLE
Abstract: The role of **cytokinin** as a limiting and controlling factor in the differentiation of vascular tissues in the **plant** body is discussed. **Cytokinin** controls the early stages of fibre differentiation in Helianthus stems and the regeneration of vessels and sieve tubes around a wound in Coleus internodes. The influence of **cytokinin** on cell differentiation in the vascular tissues varies according to its physiological levels and the levels of auxin. **Cytokinin** induces an acropetal polar pattern of vessel regeneration around a wound in internodes of Coleus. Similarly, adventitious roots induce acropetal polar patterns of vessel maturation in hypocotyls of Cucurbita. **Cytokinin** increases the sensitivity of the vascular cambium to the auxin stimulation, resulting in the highest ratio of phloem/xylem under the optimal level of **cytokinin**. High levels of **cytokinin** promote callose production on sieve plates. Studies of transgenic **plants** with altered levels of **cytokinin** (overexpressing the **ipt** gene) confirm the involvement of **cytokinin** in vascular differentiation.

9/3,AB/4 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02767276 Genuine Article#: MC821 Number of References: 87
Title: ALTERATIONS IN AUXIN AND **CYTOKININ** METABOLISM OF HIGHER-**PLANTS** DUE TO EXPRESSION OF SPECIFIC GENES FROM PATHOGENIC BACTERIA - A REVIEW (Abstract Available)
Author(s): HAMILL JD
Corporate Source: MONASH UNIV,DEPT GENET & DEV BIOL/CLAYTON/VIC 3168/AUSTRALIA/
Journal: AUSTRALIAN JOURNAL OF PLANT PHYSIOLOGY, **1993**, V20, N4-5, P 405-423
ISSN: 0310-7841
Language: ENGLISH Document Type: ARTICLE
Abstract: This review deals with the physiological and morphological effects of altering the auxin/**cytokinin** balance in transgenic **plants** by expressing specific genes from pathogenic bacteria. Genes which have been used to alter auxin levels or sensitivity in transgenic **plants** include the iaaM/iaaH genes from Agrobacterium tumefaciens and A. rhizogenes; gene 5 and possibly gene 6b from A. tumefaciens; the rol B and possibly the rol A gene from A. rhizogenes and the iaaL gene from Pseudomonas syringae subsp. savastanoi (P. savastanoi). Genes which have been used to alter **cytokinin** levels in transgenic **plants** include the **ipt** gene from A. tumefaciens and the rol C gene from A. rhizogenes. A variety of biochemical mechanisms have been identified which result in alterations to phytohormone levels following expression of these genes in transgenic **plants**. Many of the effects on **plant** development are consistent with observations made following exogenous auxin and/or

cytokinin application to **plant** tissues, and the availability of these genes offers a new approach to the study of **plant** physiology using transformation methodology.

9/3,AB/5 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

01117725 Genuine Article#: FX732 Number of References: 42
Title: DELAYED LEAF SENESCENCE IN TOBACCO **PLANTS** TRANSFORMED WITH TMR, A GENE FOR **CYTOKININ** PRODUCTION IN AGROBACTERIUM (Abstract Available)
Author(s): SMART CM; SCOFIELD SR; BEVAN MW; DYER TA
Corporate Source: AFRC,INST GRASSLAND & ENVIRONM RES,WELSH PLANT BREEDING STN,PLAS GOGERDDAN/ABERYSTWYTH SY23 3EB/DYFED/WALES/; JOHN INNES CTR PLANT SCI RES,CAMBRIDGE LAB/NORWICH NR4 7UJ//ENGLAND/; JOHN INNES CTR PLANT SCI RES,SAINSBURY LAB/NORWICH NR4 7UJ//ENGLAND/
Journal: PLANT CELL, **1991**, V3, N7, P647-656
Language: ENGLISH Document Type: ARTICLE
Abstract: The aim of this study was to investigate whether enhanced levels of endogenous **cytokinins** could influence **plant** development, particularly leaf senescence. Tobacco **plants** were transformed with the Agrobacterium tumefaciens gene tmr, under the control of the soybean heat shock promoter HS6871. This gene encodes the enzyme **isopentenyl transferase**, which catalyzes the initial step in **cytokinin** biosynthesis. After heat shock, the **cytokinin** level increased greatly and the level of tmr mRNA, undetectable at 20-degrees-C, rose and remained high for up to 8 hours. The levels of **cytokinin** and tmr mRNA were substantially lower by 24 hours. Transformed **plants** grown at 20-degrees-C were shorter, had larger side shoots, and remained green for longer than untransformed **plants**. The differences were more pronounced after several heat shocks of whole **plants** or defined areas of leaves. Our results demonstrated that **plant** morphology and leaf senescence can be manipulated by changing the endogenous level of **cytokinins**.

9/3,AB/6 (Item 4 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

00765104 Genuine Article#: EV082 Number of References: 38
Title: **CYTOKININ** CONTENT AND TISSUE DISTRIBUTION IN **PLANTS** TRANSFORMED BY A RECONSTRUCTED **ISOPENTENYL TRANSFERASE** GENE
Author(s): SMIGOCKI AC
Corporate Source: USDA ARS,BELTSVILLE AGR RES CTR,PLANT MOLEC BIOL LAB/BELTSVILLE//MD/20705
Journal: PLANT MOLECULAR BIOLOGY, **1991**, V16, N1, P105-115
Language: ENGLISH Document Type: ARTICLE
?

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 Set     Items   Description
 S1      50989   CYTOKININ?
 S2        793   S1 AND (IPT OR (ISOPENTENYL AND TRANSFERASE))
 S3        541   S2 AND PY<1999
 S4        517   S3 AND PLANT?
 S5         20   S4 AND ZEA (W) MAYS
 S6         18   RD (unique items)
 S7          0   S3 NOT S5 AND ZEA (W) MAYS
 S8          9   S4 AND (MAIZE OR CORN) NOT S5
 S9          6   RD (unique items)
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              517  S4
               20  S5
               18  S6
                0  S7
                9  S8
                6  S9
     S10      488  S4 NOT S5-S9
? s s10 and (modulat? or inhibit? or express?)
Processing
Processed  10 of  22 files ...
Processing
Completed processing all files
              488  S10
           947180  MODULAT?
          4130505  INHIBIT?
          3867779  EXPRESS?
     S11      317  S10 AND (MODULAT? OR INHIBIT? OR EXPRESS?)
? rd
>>>Duplicate detection is not supported for File 235.
>>>Duplicate detection is not supported for File 306.

>>>Records from unsupported files will be retained in the RD set.
...examined 50 records  (50)
...examined 50 records  (100)
...examined 50 records  (150)
...examined 50 records  (200)
...examined 50 records  (250)
...examined 50 records  (300)
...completed examining records
     S12      151  RD (unique items)
? t s12/3,ab/all
>>>No matching display code(s) found in file(s): 65, 235, 306

 12/3,AB/1      (Item 1 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

09750490   98226808   PMID: 9560269
  Agrobacterium  transcriptional regulator Ros is a prokaryotic zinc finger
protein that regulates the plant oncogene ipt.
  Chou AY; Archdeacon J; Kado CI
  Davis Crown Gall Group, University of California, Davis, CA 95616, USA.
  Proceedings  of  the National Academy of Sciences of the United States of
America (UNITED   STATES)   Apr  28  1998,  95   (9)   p5293-8,  ISSN
0027-8424   Journal Code: PV3
  Contract/Grant No.: GM45550, GM, NIGMS
  Languages: ENGLISH
  Document type: Journal Article
  Record type: Completed
  Virulence  genes  of  Agrobacterium  tumefaciens are under the control of
positive  and  negative  transcriptional  regulators.  We  found  that  the
transcriptional  regulator Ros controls expression of the plant
 oncogene  ipt, which encodes isopentenyl transferase, in
```

A. tumefaciens. This enzyme is involved in biosynthesis of the **plant** growth hormone **cytokinin** in the host **plant**. An **ipt** promoter::cat reporter gene fusion showed a 10-fold increase in **ipt** promoter activity in A. tumefaciens ros mutant strains when compared with wild type. Also, increased levels (10- to 20-fold) of **isopentenyl** adenosine, the product of the reaction catalyzed by **isopentenyl transferase** , were detected in ros mutant strains. In vitro studies using purified Ros showed it binds directly to the **ipt** promoter. Analysis of the deduced Ros amino acid sequence identified a novel type of C2H2 zinc finger. In Ros the peptide loop spacing of the zinc finger is 9 amino acids as opposed to the invariant 12 amino acids in the classical C2H2 motif. Site-directed mutagenesis of Cys-82 and His-92 in this motif showed that these residues are essential for Zn2+ and DNA binding activities of Ros. The existence of such a regulator in Agrobacterium may be due to horizontal interkingdom retrotransfer of the ros gene from **plant** to bacteria.

12/3,AB/2 (Item 2 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

09587374 97446503 PMID: 9301091
Conditional transgenic **expression** of the **ipt** gene indicates a function for **cytokinins** in paracrine signaling in whole tobacco **plants**.
Faiss M; Zalubilova J; Strnad M; Schmulling T
Universitat Tubingen, Lehrstuhl fur Allgemeine Genetik, Germany.
Plant journal (ENGLAND) Aug **1997**, 12 (2) p401-15, ISSN 0960-7412 Journal Code: BRU
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
This study investigated whether an increased production of the **plant** hormone **cytokinin** in roots, the main site of its synthesis and putative signaling organ, can influence developmental events, such as growth of axillary shoot meristems or leaf senescence, in the **plant** shoot. To this end, transgenic tobacco **plants** (Nicotiana tabacum L.) were generated that conditionally overproduce **cytokinins**. These **plants** harbour the **ipt** gene under the transcriptional control of a modified 35S promoter that is repressed in **plants** with high titers of tetracycline repressor protein. De-repression of transcription led to a rapid more than 50-fold increase of hormone concentration. The time course of changes in the steady-state levels of 16 different **cytokinin** metabolites, as a consequence of **IPT** enzyme activity, was monitored in different **plant** tissues. Zeatin riboside was the first and most dramatically increased product; zeatin, dihydrozeatin and glucosides accumulated later. The consequences of enhanced **cytokinin** synthesis remained mainly restricted to the site of hormone production. For example, de-repression of **ipt** gene transcription in lateral buds caused the growth of single buds only at the site of tetracycline application. In reciprocal grafts of transgenic **plants** with wild-type **plants**, no biological **cytokinin** effects, i.e. growth of lateral shoot meristems or sequential leaf senescence, were observed in the non-transgenic **plant** part. Also, the increase in steady-state levels of **cytokinins** remained restricted mainly to the transgenic part, despite a specific increase of the zeatin riboside concentration in the transpiration stream. These results question the role of **cytokinins** as a long-range root-to-shoot signal in correlative control of apical dominance and sequential leaf senescence of tobacco, and support the assumption that this hormone is relevant to paracrine signaling.

12/3,AB/3 (Item 3 from file: 155)

DIALOG(R)File 155:MEDLINE(R)

09302332 97245302 PMID: 9090061
Effects of seed-specific **expression** of a **cytokinin** biosynthetic gene on canola and tobacco phenotypes.
Roeckel P; Oancia T; Drevet J
Laboratoire associe Universite Blaise Pascal, INRA, Organisation et Variabilite des Genomes Vegetaux, Clermont-Ferrand, France.
Transgenic research (ENGLAND) Mar **1997**, 6 (2) p133-41, ISSN 0962-8819 Journal Code: BRX
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
The Agrobacterium tumefaciens **isopentenyl transferase** gene (**ipt**), a **cytokinin** biosynthetic gene, was placed under the control of 1.9 kb of promoter sequence from the 2S albumin AT2S1 gene isolated from an Arabidopsis thaliana library. The construct was introduced into canola (Brassica napus) and tobacco (Nicotiana tabacum). **ipt** transcripts were followed during embryo development of transgenic **plants** by northern hybridizations. The phenotype of transformed **plants** from the T1 generation was analysed and we observed an increased branching of inflorescences in tobacco and canola **plants expressing** the **ipt** gene. Comparing with controls, the average number of capsules and siliques in AT2S1-**ipt plants** was 82.6 and 24.8% higher, respectively. This result was correlated with an increase in **cytokinin** levels in transgenic **plants**, as revealed by RIA. Indeed, **cytokinin** contents of T1 AT2S1-**ipt** B. napus seeds were found 2.2-fold higher than **cytokinin** contents of control seeds, and T1 AT2S1-**ipt** N. tabacum capsules contained 2.6-fold more **cytokinins** than control capsules. In tobacco, the average seed weight per capsule was lower in AT2S1-**ipt plants** while the seed number per silique and the average seed weight were not modified in canola carrying this construct. The average seed yield per **plant** was not significantly increased in AT2S1-**ipt** tobacco or canola **plants**.

12/3,AB/4 (Item 4 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08865899 96165737 PMID: 8589740
Expression of the **isopentenyl transferase** gene is regulated by auxin in transgenic tobacco tissues.
Zhang XD; Letham DS; Zhang R; Higgins TJ
CSIRO Division of Plant Industry, Canberra, Australia.
Transgenic research (ENGLAND) Jan **1996**, 5 (1) p57-65, ISSN 0962-8819 Journal Code: BRX
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
The **isopentenyl transferase** gene (**ipt**) from Agrobacterium tumefaciens was isolated and introduced, via a disarmed binary vector, into tobacco using the Agrobacterium tumefaciens-mediated gene transfer system. The **expression** of the **ipt** gene was monitored by RNA hybridization, western blotting and **cytokinin** analysis. The addition of auxin to the media rapidly reduced the level of **cytokinins** in the transgenic tissues and this was associated with a reduction in **IPT** mRNA and protein levels. It is concluded that the hormone auxin can regulate **expression** of a gene involved in biosynthesis of the second hormone **cytokinin**. Although exogenous benzyladenine did not directly affect **ipt** gene **expression**, it did antagonize the effect of auxin on levels of **cytokinins** and **IPT** mRNA and protein.

12/3,AB/5 (Item 5 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08765719 95195152 PMID: 7888614
Light-induced **expression** of **ipt** from Agrobacterium tumefaciens results in **cytokinin** accumulation and osmotic stress symptoms in transgenic tobacco.
Thomas JC; Smigocki AC; Bohnert HJ
Department of Biochemistry, University of Arizona, Tucson 85721.
Plant molecular biology (NETHERLANDS) Jan **1995**, 27 (2) p225-35
, ISSN 0167-4412 Journal Code: A6O
Erratum in Plant Mol Biol 1995 Aug;28(5) 965
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
Cytokinins are **plant** growth regulators that induce shoot formation, **inhibit** senescence and root growth. Experiments with hydroponically grown tobacco **plants** , however, indicated that exogenously applied **cytokinin** led to the accumulation of proline and osmotin. These responses were also associated with environmental stress reactions, such as salt stress, in many **plant** species. To test whether increased endogenous **cytokinin** accumulation led to NaCl stress symptoms, the gene **ipt** from Agrobacterium tumefaciens, encoding **isopentenyl transferase** , was transformed into Nicotiana tabacum cv. SR-1 under the control of the light-inducible rbcS-3A promoter from pea. In high light (300 mumol PPFD m-2 s-1), **ipt** mRNA was detected and zeatin/zeatin glucoside levels were 10-fold higher than in control **plants** or when transformants were grown in low light (30 mumol PPFD m-2 s-1). High light treatment was accompanied by increased levels of proline and osmotin when compared to low light grown transformed and untransformed control **plants**. Elevated in **planta** **cytokinin** levels induced responses also stimulated by salt stress, suggesting either common or overlapping signaling pathways are initiated independently by **cytokinin** and NaCl, setting in motion gene **expression** normally elicited by developmental processes such as flowering or environmental stress.

12/3,AB/6 (Item 6 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08763598 96174437 PMID: 8592746
Inhibition of leaf senescence by autoregulated production of **cytokinin**.
Gan S; Amasino RM
Department of Biochemistry, University of Wisconsin, Madison, 53706-1569, USA.
Science (UNITED STATES) Dec 22 **1995**, 270 (5244) p1986-8, ISSN 0036-8075 Journal Code: UJ7
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
Controlling **expression** of **IPT** , a gene encoding isopentenyltransferase (the enzyme that catalyzes the rate-limiting step in **cytokinin** biosynthesis), with a senescence-specific promoter results in the suppression of leaf senescence. Transgenic tobacco **plants** **expressing** this chimeric gene do not exhibit the developmental abnormalities usually associated with **IPT expression** because the system is autoregulatory. Because sufficient **cytokinin** is produced to retard senescence, the activity of the senescence-specific promoter is attenulated. Senescence-retarded leaves exhibit a prolonged, photosythetically active life-span. This result demonstrates that endogenously produced **cytokinin** can regulate senescence and provides a system to specifically manipulate the senescence program.

12/3,AB/7 (Item 7 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08340865 95152559 PMID: 7849758
Promoter tagging with a promoterless **ipt** gene leads to **cytokinin**-induced phenotypic variability in transgenic tobacco **plants**:implications of gene dosage effects.
Hewelt A; Prinsen E; Schell J; Van Onckelen H; Schmulling T
Universitat Tubingen, Lehrstuhl fur Allgemeine Genetik, Germany.
Plant journal (ENGLAND) Dec **1994**, 6 (6) p879-91, ISSN 0960-7412 Journal Code: BRU
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
Tobacco **plants** have been transformed with a T-DNA construct harboring a promoterless **cytokinin**-synthesizing **ipt** gene close to the right T-DNA border. Eighteen out of 85 transgenic clones displayed phenotypic alternations typical for an enhanced **cytokinin** production. Northern blot analysis confirmed the transcriptional activation of the introduced gene by tagged **plant** promoters. The concentration of **cytokinins**, **expressed** as zeatinriboside equivalents, was increased up to sevenfold in transgenic tissues. These increases in **cytokinin** levels resulted in major developmental changes. Transgenic clones exhibited to different levels traits of a general **cytokinin** -syndrome, i.e. reduced root growth, reduced apical dominance, reduced leaf surface, reduced growth of the stem and retarded leaf senescence or displayed localized and developmentally specific **cytokinin**-induced alterations in otherwise normally developing **plants**. These traits were in particular a simultaneous break of dormancy in all axillary buds before or at the onset of flowering or the reorientation of the developmental pathway of secondary meristems or terminally differentiated cells. This indicates that endogenously produced **cytokinins** not only influence different growth parameters but have the potential to alter differentiation pattern. The results show that stably inherited developmental alterations due to a general or localized **cytokinin** overproduction can be obtained by the promoter-tagging approach. The investigation of gene dosage effects in homozygote **plants** readdresses the question of threshold levels for **cytokinin** effects on the developmental program of **plants**.

12/3,AB/8 (Item 8 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

08011082 94035187 PMID: 8106083
Floral development and **expression** of floral homeotic genes are influenced by **cytokinins**.
Estruch JJ; Granell A; Hansen G; Prinsen E; Redig P; Van Onckelen H; Schwarz-Sommer Z; Sommer H; Spena A
Max-Planck-Institut fur Zuchtungsforschung, Koln, Germany.
Plant journal (ENGLAND) Aug **1993**, 4 (2) p379-84, ISSN 0960-7412 Journal Code: BRU
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
Tobacco **plants** that are somatic mosaics for the **expression** of a **cytokinin** -synthesizing gene have viviparous leaves. Epiphyllous buds can be either vegetative or floral. Floral adventitious buds can be either normal or abnormal. Abnormalities of floral development correlate with: (i) a local activation of the **cytokinin**-synthesizing gene, (ii) a drastic increase in floral **cytokinin** content, and (iii) a decrease in the steady-state levels of mRNA homologous of the homeotic genes DEFA,

GLO and PLENA of Antirrhinum majus. Thus, these data show in **planta** that **cytokinins**, a class of phytohormones, are able to alter the development of floral organs and to decrease the **expression** of three homeotic floral genes.

12/3,AB/9 (Item 9 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07942495 94033311 PMID: 8219068
Cytokinin-mediated insect resistance in Nicotiana **plants** transformed with the **ipt** gene.
Smigocki A; Neal JW; McCanna I; Douglass L
Plant Molecular Biology Laboratory, U.S. Department of Agriculture, Beltsville, MD 20705.
Plant molecular biology (NETHERLANDS) Oct **1993**, 23 (2) p325-35, ISSN 0167-4412 Journal Code: A6O
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
The bacterial **isopentenyl transferase** (**ipt**) gene involved in **cytokinin** biosynthesis was fused with a promoter from the proteinase **inhibitor** II (PI-IIK) gene and introduced into Nicotiana plumbaginifolia. Transcripts of the **ipt** gene were wound-inducible in leaves of transgenic PI-II-**ipt plants**. In leaf disks excised from fully expanded leaves, transcript levels increased 25- to 35-fold within 24 h and by 48 h were reduced by about 50%. In flowering **plants**, message levels were 2- to 5-fold higher than in preflowering **plants**. These **plants** were used to test for defensive properties of **cytokinins** against insects. Manduca sexta larvae consumed up to 70% less of the PI-II-**ipt** leaf material on flowering **plants** than larvae feeding on controls. Normal development of Myzus persicae nymphs was also delayed. Approximately half as many nymphs reached adulthood on PI-II-**ipt** leaves than on controls. Zeatin and zeatinriboside levels in leaves remaining on PI-II-**ipt plants** after hornworm feeding were elevated by about 70-fold and the chlorophyll a/b content was double that of controls. Exogenous applications of zeatin to the PI-II-**ipt** leaves enhanced the level of resistance to the tobacco hornworm and almost completely **inhibited** normal development of the green peach aphid nymphs. Transcript levels of an acidic chitinase gene were low and minimally inducible in PI-II-**ipt** leaves. The mode of action of the **cytokinin** gene product on enhanced insect resistance is not clear but may involve the products of secondary metabolic pathways.

12/3,AB/10 (Item 10 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07899388 93271451 PMID: 8499612
Regulatable endogenous production of **cytokinins** up to 'toxic' levels in transgenic **plants** and **plant** tissues.
Ainley WM; McNeil KJ; Hill JW; Lingle WL; Simpson RB; Brenner ML; Nagao RT; Key JL
Botany Department, University of Georgia, Athens 30602.
Plant molecular biology (NETHERLANDS) Apr **1993**, 22 (1) p13-23, ISSN 0167-4412 Journal Code: A6O
Contract/Grant No.: GM30317, GM, NIGMS
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
The effects of **expressing** a chimeric gene consisting of a soybean heat shock gene promoter and a sequence that encodes an enzyme catalyzing the synthesis of a potent phytohormone, the **cytokinin** iPMP, have been analyzed in transgenic tobacco **plants**. The production of

cytokinin endogenously produced several effects previously undocumented. The differentiation of shoots independent of exogenous **cytokinin** from heat-treated transgenic **plant** leaf explants demonstrates that long-term heat treatments do not interfere with complex developmental processes. This extends the potential usefulness of heat shock gene promoters to conditionally **express** genes during windows of development that span several weeks.

12/3,AB/11 (Item 11 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07642913 93012484 PMID: 1397692
Altered morphology in transgenic tobacco **plants** that overproduce **cytokinins** in specific tissues and organs.
Li Y; Hagen G; Guilfoyle TJ
Department of Biochemistry, University of Missouri, Columbia 65211.
Developmental biology (UNITED STATES) Oct **1992**, 153 (2) p386-95, ISSN 0012-1606 Journal Code: E7T
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
An auxin-inducible bidirectional promoter from the soybean SAUR gene locus was fused to a reporter gene in one direction and a **cytokinin** biosynthetic gene in the opposite direction and the **expression** of these fused genes was examined in transgenic tobacco. The Escherichia coli uidA gene, which encodes the enzyme beta-glucuronidase (GUS), was used as the reporter gene and the Agrobacterium tumefaciens **ipt** gene, which encodes the enzyme **isopentenyl transferase**, was used as the **cytokinin** biosynthetic gene. These constructs allowed the overproduction of **cytokinins** in tobacco in a tissue- and organ-specific manner. Localized overproduction of **cytokinins** was monitored using the GUS reporter gene and measured by an ELISA assay. The tissue- and organ-specific overproduction of **cytokinins** produced a number of morphological and physiological changes, including stunting, loss of apical dominance, reduction in root initiation and growth, either acceleration or prolonged delayed senescence in leaves depending on the growth conditions, adventitious shoot formation from unwounded leaf veins and petioles, altered nutrient distribution, and abnormal tissue development in stems. While some of these morphological changes result directly from the localized overproduction of **cytokinins**, other changes probably result from the mobilization of **plant** nutrients to tissues rich in **cytokinins**.

12/3,AB/12 (Item 12 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07580111 92192012 PMID: 1547783
Fasciation induction by the phytopathogen Rhodococcus fascians depends upon a linear plasmid encoding a **cytokinin** synthase gene.
Crespi M; Messens E; Caplan AB; van Montagu M; Desomer J
Laboratorium voor Genetica, Universiteit Gent, Belgium.
EMBO journal (ENGLAND) Mar **1992**, 11 (3) p795-804, ISSN 0261-4189 Journal Code: EMB
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
Rhodococcus fascians is a nocardiform bacteria that induces leafy galls (fasciation) on dicotyledonous and several monocotyledonous **plants**. The wild-type strain D188 contained a conjugative, 200 kb linear extrachromosomal element, pFiD188. Linear plasmid-cured strains were avirulent and reintroduction of this linear element restored virulence. Pulsed field electrophoresis indicated that the chromosome might also be a

linear molecule of 4 megabases. Three loci involved in phytopathogenicity have been identified by insertion mutagenesis of this Fi plasmid. Inactivation of the fas locus resulted in avirulent strains, whereas insertions in the two other loci affected the degree of virulence, yielding attenuated (att) and hypervirulent (hyp) bacteria. One of the genes within the fas locus encoded an isopentenyltranferase (**IPT**) with low homology to analogous proteins from Gram-negative phytopathogenic bacteria. **IPT** activity was detected after **expression** of this protein in Escherichia coli cells. In R.fascians, **ipt expression** could only be detected in bacteria induced with extracts from fasciated tissue. R.fascians strains without the linear plasmid but containing this fas locus alone could not provoke any phenotype on **plants** , indicating additional genes from the linear plasmid were also essential for virulence. These studies, the first genetic analysis of the interaction of a Gram-positive bacterium with **plants**, suggest that a novel mechanism for **plant** tumour induction has evolved in R.fascians independently from the other branches of the eubacteria.

12/3,AB/13 (Item 13 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07445949 91363830 PMID: 1888890
Cytokinin content and tissue distribution in **plants** transformed by a reconstructed **isopentenyl transferase** gene.
Smigocki AC
Plant Molecular Biology Laboratory, U.S. Department of Agriculture, Beltsville, MD 20705.
Plant molecular biology (NETHERLANDS) Jan **1991**, 16 (1) p105-15
, ISSN 0167-4412 Journal Code: A6O
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
The **cytokinin** gene, **isopentenyl transferase** (**ipt**), was placed under the control of a heat-inducible promoter from the Drosophila melanogaster hsp70 gene and introduced into Nicotiana plumbaginifolia by cocultivation with Agrobacterium tumefaciens. Transformants were analyzed for organ-specific **expression**, **cytokinin** levels and effects on **plant** development before and after the heat induction. The **ipt** gene transcripts were detected in leaves and stems but not roots of transgenic **plants** following a 2 hour, 45 degrees C treatment. Maximum mRNA levels observed occurred 2 hours after heat treatment and 46 hours later were detected only in leaves. Zeatin and zeatinriboside concentrations 2 hours after heat shock ranged from over 900 to 2000 pmol/g, representing a greater than 140- to 200-fold increase over uninduced levels. After 46 hours, approximately 50% of the **cytokinins** are still present in the leaves as opposed to much reduced levels in the stems. Transgenic **plants** were greener, shorter, had an underdeveloped root system, reduced leaf width, and increased growth of axillary buds. After a single heat treatment, **plants** exhibited a darker green pigment and continued growth of lateral buds. Transient accumulations of endogenous **cytokinins** following thermal induction did not appear to alter the **plant** 's preprogrammed pattern of differentiation.

12/3,AB/14 (Item 14 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

07333998 91355889 PMID: 2103461
Restoration of shooty morphology of a nontumorous mutant of Nicotiana glauca x N. langsdorffii by **cytokinin** and the isopentenyltransferase gene.
Feng XH; Dube SK; Bottino PJ; Kung SD

Center for Agricultural Biotechnology, University of Maryland, College Park 20742.
Plant molecular biology (NETHERLANDS) Sep **1990**, 15 (3) p407-20
, ISSN 0167-4412 Journal Code: A60
Languages: ENGLISH
Document type: Journal Article
Record type: Completed
The shooty morphology of a nontumorous amphidiploid mutant of Nicotiana glauca Grah. x N. langsdorffii Weinm. was restored by **cytokinins**, whether exogenously applied or endogenously produced by transformation of the mutant with a transfer DNA (T-DNA) **cytokinin**-biosynthesis gene (isopentenyltransferase; **ipt**). Auxins alone did not confer this effect. Similar transformation was not achieved for the parental species. In the case of transformation with the **ipt** gene, selection of the transformed tissues was based on its hormone-independent growth in the presence of the antibiotic kanamycin. Transformed tissues exhibited a shooty morphology, indistinguishable from that of wildtype genetic tumors N. glauca x N. langsdorffii. This altered phenotype was caused by the presence and constitutive **expression** of the **ipt** gene. The insertion and **expression** of this gene in transformed tissues was confirmed by using the polymerase chain reaction (PCR) technique as well as conventional molecular hybridization analysis. **Expression** of the **ipt** gene led to an elevated level of **cytokinin** in the transformed mutant tissues. This evidence supports the notion that genetic tumors are caused, at least in part, by elevated levels of **cytokinin** in interspecific hybrids.

12/3,AB/15 (Item 15 from file: 155)
DIALOG(R)File 155:MEDLINE(R)

05334767 90043783 PMID: 2811903
Transfer of the agrobacterial gene for **cytokinin** biosynthesis into tobacco **plants**]
Perenos v rasteniia tabaka agrobakterial'nogo gena biosinteza tsitokinina.
Iusibov VM; Pogosian GP; Andrianov VM; Piruzian ES
Molekuliarnaia genetika, mikrobiologiia i virusologiia (USSR) Jul **1989**, (7) p11-3, ISSN 0208-0613 Journal Code: NMJ
Languages: RUSSIAN
Document type: Journal Article
Record type: Completed
The gene transfer into **plants** using the genetic engineering methods gives us the possibility to obtain transgeneric **plants** having acquired the new traits. Some bacterial genes can be used for this purpose. Obtaining of a transgeneric **plant** harbouring the **cytokinin** synthesis gene **ipt** (gene 4) from the T-DNA of Agrobacterium tumefaciens Ti-plasmid seems to be useful. The **expression** of tumor agrobacterial **ipt** gene in transformed **plant** cells interferes with the normal growth and regulation of the whole **plant**. The successful transfer of the cloned **ipt** gene from the recombinant plasmid pGV0319 into the tobacco **plant** using Agrobacterium vectors and succeeding regeneration of phenotypically normal transgenic **plants** are reported in the present paper.

12/3,AB/16 (Item 1 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

12920094 BIOSIS NO.: 200100127243
Morphogenetic manifestations of the **expression** of the bacterial **ipt** gene in regenerated tobacco **plants** in vitro.
AUTHOR: Makarova R V; Andrianov V M; Borisova T A; Piruzyan E S; Kefeli V I

JOURNAL: Fiziologiya Rastenii (Moscow) 44 (1):p11-19 January-February, **1997**
MEDIUM: print
ISSN: 0015-3303
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: Russian; Non-English
SUMMARY LANGUAGE: English; Russian

ABSTRACT: The capacity of normal and transgenic tobacco **plants** (Nicotiana tabacum L.) for regeneration, callus and organ formation after the **expression** of the active agrobacterial **ipt** gene was studied. In the **cytokinin**-transgenic explants (with the **ipt** gene), callus formation began only in the presence of 2,4-D and kinetin. Later the growth of callus tissue was hormone-independent. In the **ipt** regenerants, an abbreviated, particularly leafy shoot took shape, and the roots became implanted three to five days earlier. It was proposed that the morphological features of the **ipt** regenerants were conditioned by the specifics of their hormonal system.

1997

12/3,AB/17 (Item 2 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

12655665 BIOSIS NO.: 200000409167
Transgenic Arabidopsis **plants expressing ipt**-gene.
AUTHOR: Werner T(a); Rupp H M; Scmuelling T; Van Onckelen H; Strnad M(a)
AUTHOR ADDRESS: (a)Laboratory of Growth Regulators, Palacky University and Institute of Experimental Botany, Academy of Sciences of Czech Republic, 11 Slechtitelu, 783 71, Olomouc**Czech Republic
JOURNAL: Bulgarian Journal of Plant Physiology (Special Issue):p127
1998
MEDIUM: print
CONFERENCE/MEETING: 11th Congress of the Federation of European Societies of Plant Physiology Varna, Bulgaria September 07-11, 1998
ISSN: 1310-4586
RECORD TYPE: Citation
LANGUAGE: English
SUMMARY LANGUAGE: English
1998

12/3,AB/18 (Item 3 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

12655658 BIOSIS NO.: 200000409160
Mechanisms controlling **cytokinin** levels in **plant** cells.
AUTHOR: Kaminek M(a); Motyka V; Gaudinova A; Dobrev P; Vankova R; Komanek D
AUTHOR ADDRESS: (a)De Montfort University Norman Borlaug Institute for Plant Science, Institute of Experimental Botany, Academy of Sciences of the Czech Republic, Rozvojova 135, 16502, Prague 6**Czech Republic
JOURNAL: Bulgarian Journal of Plant Physiology (Special Issue):p124
1998
MEDIUM: print
CONFERENCE/MEETING: 11th Congress of the Federation of European Societies of Plant Physiology Varna, Bulgaria September 07-11, 1998
ISSN: 1310-4586
RECORD TYPE: Citation
LANGUAGE: English
SUMMARY LANGUAGE: English

1998

12/3,AB/19 (Item 4 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11827888 BIOSIS NO.: 199900073997
Autonomy to **plant** growth regulators and gene **expression** in periwinkle cultures in vitro.
AUTHOR: Droual Anne-Marie(a); Hamdi Said(a); Creche Joel(a); Kevers Claire; Rideau Marc(a)
AUTHOR ADDRESS: (a)Lab. Biol. Mol. Biochim. Vegetale, EA 2106, Fac. Pharm., 31 Ave. Monge, F-37200 Tours-Cedex**France
JOURNAL: Journal of Plant Physiology 153 (5-6):p623-630 Nov., **1998**
ISSN: 0176-1617
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: To better understand the effect of habituation on gene **expression** in **plant** cells, we have compared the accumulation of specific mRNAs encoding respectively two proline-rich proteins, a chaperone protein and three enzymes linking primary and secondary metabolisms in two models of in vitro culture of periwinkle. These models consisted of two couples of a 2,4-dichlorophenoxyacetic acid-dependent/2,4-dichlorophenoxyacetic acid independent line in which autonomy to auxin and **cytokinin** was obtained either through habituation or through transformation with the isopentenyltransferase gene from Agrobacterium tumefaciens. Results showed that gene **expression** was modified by **plant** growth regulator autonomy but differently according to the type of autonomy: only the gene encoding a hydroxyproline-rich glycoprotein was regulated similarly in both PGR-independent lines. On the other hand, PGR autonomy did not lead to total insensitivity to exogenously-applied PGRs, and the two PGR autonomous lines did not accumulate indole alkaloids for different reasons.

1998

12/3,AB/20 (Item 5 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11666966 BIOSIS NO.: 199800448697
Expression of the bacterial **ipt** gene in Physcomitrella rescues mutations in budding and in plastid division.
AUTHOR: Reutter Kirsten; Atzorn Rainer; Hadeler Birgit; Schmuelling Thomas; Reski Ralf(a)
AUTHOR ADDRESS: (a)Albert-Ludwigs-Universitaet, Institut fuer Biologie II, Schaenzlestr. 1, D-79104 Freiburg**Germany
JOURNAL: Planta (Berlin) 206 (2):p196-203 Oct., **1998**
ISSN: 0032-0935
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Development of Physcomitrella patens (Hedw.) B.S.G. starts with a filamentous protonema growing by apical cell division. As a developmental switch, some subapical cells produce three-faced apical cells, the so-called buds, which grow to form leafy shoots, the gametophores. Application of **cytokinins** enhances bud formation but no subsequent gametophore development in several mosses. We used the **ipt** gene of

Agrobacterium tumefaciens, encoding a protein which catalyzes the rate-limiting step in **cytokinin** biosynthesis, to transform two developmental Physcomitrella mutants. One mutant (P24) was defective in budding (bud) and thus did not produce three-faced cells, while the other one (PC22) was a double mutant, defective in plastid division (pdi), thus possessing at the most one giant chloroplast per cell, and in gametophore development (gad), resulting in malformed buds which could not differentiate into leafy gametophores. **Expression** of the **ipt** gene rescued the mutations in budding and in plastid division but not the one in gametophore development. By mutant rescue we provide evidence for a distinct physiological difference between externally applied and internally produced **cytokinins**. Levels of immunoreactive **cytokinins** and indole-3-acetic acid were determined in tissues and in culture media of the wild-type moss, both mutants and four of their stable **ipt** transformants. Isopentenyl-type **cytokinins** were the most abundant **cytokinins** in Physcomitrella, whereas zeatin-type **cytokinins**, the major native **cytokinins** of higher **plants**, were not detectable. **Cytokinin** as well as auxin levels were enhanced in **ipt** transgenics, demonstrating a cross-talk between both metabolic pathways. In all genotypes, most of the **cytokinin** and auxin was found extracellularly. These extracellular pools may be involved in hormone transport in the non-vascular mosses. We suggest that both mutants are defective in signal-transduction rather than in **cytokinin** metabolism.

1998

12/3,AB/21 (Item 6 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11622744 BIOSIS NO.: 199800404879
The cloning of rolC gene and over **expression** of **cytokinins** in Nicotiana tabacum.
AUTHOR: Jia Yan-Tao; Ma Mi(a); Qu Gui-Ping; Qian Zhong-Xing; Lin Zhong-Ping
AUTHOR ADDRESS: (a)Inst. Bot., Chinese Acad. Sci., Beijing 100093**China
JOURNAL: Acta Botanica Sinica 40 (3):p211-215 March, **1998**
ISSN: 0577-7496
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: Chinese; Non-English
SUMMARY LANGUAGE: Chinese; English

ABSTRACT: Using PCR method the rolC gene was amplified from Agrobacterium rhizogenes, and CaMV 35S/rolC **expression** vector pCaR was constructed. The chimeric gene via agrobacterium mediated procedure was transformed separately into the wild type tobacco (Nicotiana tabacum L. cv. W38) and the transgenic tobacco of **ipt** gene. The putative transgenic **plants** were assayed with Southern blot and RNA Dot blot analysis. The observation suggested that the transgenic tobacco exhibited the abnormal phenotypes as a consequence of the overproduction of **cytokinins**. Whereas the ELISA assay indicated that the **cytokinins** level increased separately in transgenic **plants**. The growth of the transgenic **plants** show multiple budding of shoots with short internodal length.

1998

12/3,AB/22 (Item 7 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11610186 BIOSIS NO.: 199800391950
Phenotypes of tobacco **plants expressing** genes for the synthesis of growth regulators.
AUTHOR: Hlinkova E(a); Obert B; Filipp D(a)
AUTHOR ADDRESS: (a)Dep. Genet., Fac. Nat. Sci., Comenius Univ., 84215 Bratislava**Slovakia
JOURNAL: Biologia Plantarum (Prague) 41 (1):p25-37 **1998**
ISSN: 0006-3134
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The **expression** of genes for synthesis of auxin (iaaM and iaaH) and **cytokinins** (**ipt**) was studied in tobacco **plants** transformed by two Agrobacterium tumefaciens strains C 58 and LBA 4404. The strain LBA 4404 carried binary vector plasmid pCB 1334 (**ipt** gene) and plasmid pCB 1349 (iaaM, iaaH and ila genes). Both plasmids carried reported gene for npt II. Obtained **plants expressed** incorporated genes. New proteins with molecular masses of about 74, 40, 26, 25, 21 and 17 kDa for wild plasmid pTi C58; 60, 36, 31.5, 27, 26 and 17 kDa for binary vector plasmid pCB 1334 and 74, 49, 36, 31.5, 26 and 25 kDa for binary vector plasmid pCB 1349 were found in the patterns of soluble proteins. Significant changes in the content of chlorophylls, especially chlorophyll a, were detected in the **plants** carrying **ipt** gene and in **plants** transformed by the wild strain C58 of A. tumefaciens. Tobacco **plants expressing ipt** gene and genes from T-DNA of pTi C58 plasmid were dwarf, and in comparison to the controls, they had thicker stems, and the surface of the leaf blades was reduced to 20-50%. Adventitious roots, growing from the stem, were typical for transformants overproducing auxins. Regenerants and transformants **expressing** genes from T-DNA of plasmid pTi C58 differed in the shape of the flowers and their fertility.

1998

12/3,AB/23 (Item 8 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11447051 BIOSIS NO.: 199800228383
Seed-specific **expression** of the **isopentenyl transferase** gene (**ipt**) in transgenic tobacco.
AUTHOR: Ma Qing-Hu; Zhang Ren; Hocart Charles H(a); Letham David S; Higgins Thomas J V
AUTHOR ADDRESS: (a)Plant Biol. Group, Research School Biol. Sciences, Australian National Univ., GPO Box 475, Canbe**Australia
JOURNAL: Australian Journal of Plant Physiology 25 (1):p53-59 **1998**
ISSN: 0310-7841
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The Agrobacterium tumefaciens gene encoding **isopentenyl transferase** (**ipt**), a **cytokinin** biosynthetic gene, was fused to a promoter from a seed-specific gene, vicilin, and introduced into tobacco cells. Intact fertile **plants** were generated. The **expression** of the vicilin-**ipt** gene was shown to be confined to seed and resulted in enhanced levels of **cytokinins** in the developing seeds and increased seed protein content. Using a simplified quantification method, a significant increase in the levels of endogenous **cytokinins** was recorded at 16-21 days after flowering. The growth of the transgenic **plants** and the development of the seeds appeared to be normal.

1998

12/3,AB/24 (Item 9 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11436866 BIOSIS NO.: 199800218198
Controlled **cytokinin** production in transgenic tobacco using a copper-inducible promoter.
AUTHOR: McKenzie Marian Jane(a); Mett Vadim; Reynolds Paul Hugh Stewart; Jameson Paula Elizabeth
AUTHOR ADDRESS: (a)Dep. Plant Biol. Biotechnol., Massey Univ., Private Bag 11222, Palmerston North**New Zealand
JOURNAL: Plant Physiology (Rockville) 116 (3):p969-977 March, **1998**
ISSN: 0032-0889
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The **cytokinin** group of **plant** hormones regulates aspects of **plant** growth and development, including the release of lateral buds from apical dominance and the delay of senescence. In this work the native promoter of a **cytokinin** synthase gene (**ipt**) was removed and replaced with a Cu-controllable promoter. Tobacco (Nicotiana tabacum L. cv tabacum) transformed with this Cu-inducible **ipt** gene (Cu-**ipt**) was morphologically identical to controls under noninductive conditions in almost all lines produced. However, three lines grew in an altered state, which is indicative of **cytokinin** overproduction and was confirmed by a full **cytokinin** analysis of one of these lines. The in vitro treatment of morphologically normal Cu-**ipt** transformants with Cu2+ resulted in delayed leaf senescence and an increase in **cytokinin** concentration in the one line analyzed. In vivo, inductive conditions resulted in a significant release of lateral buds from apical dominance. The morphological changes seen during these experiments may reflect the spatial aspect of control exerted by this gene **expression** system, namely **expression** from the root tissue only. These results confirmed that endogenous **cytokinin** concentrations in tobacco transformants can be temporally and spatially controlled by the induction of **ipt** gene **expression** through the Cu-controllable gene-**expression** system.

1998

12/3,AB/25 (Item 10 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11271836 BIOSIS NO.: 199800053168
Studies of **cytokinin** action and metabolism using tobacco **plants expressing** either the **ipt** or the GUS gene controlled by a chalcone synthase promoter. II. **ipt** and GUS gene **expression**, **cytokinin** levels and metabolism.
AUTHOR: Wang Jian; Letham D S(a); Cornish Edwina; Wei K; Hocart C H; Michael M; Stevenson K R
AUTHOR ADDRESS: (a)Cooperative Res. Centre Plant Sci., Res. Sch. Biological Sci., Australian Natl. Univ., GPO Box 4**Australia
JOURNAL: Australian Journal of Plant Physiology 24 (5):p673-683 **1997**
ISSN: 0310-7841
DOCUMENT TYPE: Article
RECORD TYPE: Abstract

LANGUAGE: English

ABSTRACT: The **expression** of GUS and **ipt** genes under control of a chalcone synthase (chs) promoter (PCHS) has been determined in tobacco (Nicotiana tabacum L.) **plants** and related to the development of **plants expressing** the chimaeric PCHS-**ipt** gene. GUS gene **expression**, which served as a model for the **expression** of the **ipt** gene, was highest in the internal phloem tissue of stems, in mature leaf laminae and in the upper part of corollas when fully open. **Expression** of the PCHS-**ipt** gene was assessed by quantifying the **cytokinins** produced, by determining incorporation of (3H)adenine into **cytokinins** and by quantifying **ipt** mRNA. Results from these studies were in general agreement with those based on **expression** of the PCHS-GUS gene. The chs promoter controlled **expression** of the **ipt** gene with some degree of tissue and temporal specificity. **Expression** of the **ipt** gene markedly elevated the **cytokinin** level in mature leaf laminae and the upper stems of flowering **plants**. The former was associated with retardation of leaf senescence and increased rates of transpiration due to changes in number, size and aperture of stomata, while the latter was associated with development of lateral shoots. In shoot tip cultures, 2-fold elevations in endogenous **cytokinin** level caused clear changes in development and this is discussed in relation to current concepts concerning the hormonal control of **plant** development. Using the transgenic tobacco tissues, it was shown that cis-zeatin is a substrate for **cytokinin** oxidase, that cis-zeatin is not converted to trans-zeatin in these tissues and that the endogenous **cytokinin** level influences the level of **cytokinin** oxidase activity in tissue and the rate of degradation of exogenous zeatin riboside to adenosine.
1997

12/3,AB/26 (Item 11 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11271835 BIOSIS NO.: 199800053167
Studies of **cytokinin** action and metabolism using tobacco **plants** **expressing** either the **ipt** or the GUS gene controlled by a chalcone synthase promoter. I. Developmental features of the transgenic **plants**.
AUTHOR: Wang Jian; Letham D S(a); Cornish Edwina; Stevenson K R
AUTHOR ADDRESS: (a)Cooperative Res. Centre Plant Sci., Res. Sch. Biological Sci., Australian Natl. Univ., GPO Box 4**Australia
JOURNAL: Australian Journal of Plant Physiology 24 (5):p661-672 **1997**
ISSN: 0310-7841
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: A chimaeric **cytokinin** biosynthetic gene was constructed by placing the coding region of the bacterial **ipt** gene under the control of a chalcone synthase (chs) promoter (PCHS) from Antirrhinum majus. The PCHS-**ipt** gene was transferred to tobacco (Nicotiana tabacum L.). To provide control **plants** for studies of the effect of **expression** of this gene on **plant** development, a PCHS beta-glucuronidase gene fusion was also introduced into tobacco. **Expression** of the PCHS-**ipt** gene caused release of axillary buds, **inhibition** of root development, retardation of leaf senescence, elevation of chlorophyll levels, delay in onset of flowering and retardation of flower development. These effects, which were quantified in PCHS-**ipt plants**, have previously been associated with **expression** of **ipt** genes controlled by heat shock or other promoters. Additional effects of **ipt** gene

expression characterized in PCHS-**ipt** **plants** included growth of leafy shoots from the primary root, change in leaf shape with the production of broader and larger leaves, induction of expansion of excised leaf discs and development of leaves with an enlarged midrib and enlarged veins. A particularly striking effect of the **expression** of the PCHS-**ipt** gene was development of thicker stems due mainly to increase of pith tissue caused by an enhancement of both cell division and cell enlargement. Node number per primary stem was also increased. Endogenous **cytokinin** and applied auxin interacted antagonistically to affect both root and stem development in **plants** cultured in vitro. The leaves of PCHS-**ipt** transformed **plants** exhibited increased transpiration rates and reduced diffusion resistance associated with increased number of stomata and modified stomatal dimensions. The above changes, which were associated with elevated endogenous **cytokinin** levels, are discussed in relation to previous studies with **ipt** gene transformed **plants** and to some aspects of normal **plant** development.

1997

12/3,AB/27 (Item 12 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

11060001 BIOSIS NO.: 199799681146
Taproot-specific **expression** of a **cytokinin** biosynthesis gene (**ipt**) in transgenic sugarbeet.
AUTHOR: Smigocki Ann C(a); McCanna Iris J; Ivic Snezana; Snyder Gordon W; Sicher Richard C; Owens Lowell D
AUTHOR ADDRESS: (a)USDA-ARS Plant Mol. Biol. Lab., Beltsville, MD 20705** USA
JOURNAL: Plant Physiology (Rockville) 114 (3 SUPPL.):p303 **1997**
CONFERENCE/MEETING: PLANT BIOLOGY '97: 1997 Annual Meetings of the American Society of Plant Physiologists and the Canadian Society of Plant Physiologists, Japanese Society of Plant Physiologists and the Australian Society of Plant Physiologists Vancouver, British Columbia, Canada August 2-6, 1997
ISSN: 0032-0889
RECORD TYPE: Citation
LANGUAGE: English
1997

12/3,AB/28 (Item 13 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10897302 BIOSIS NO.: 199799518447
The role of **cytokinin** biosynthetic gene in regulating the **expression** of a class of pathogenesis-related protein genes in tobacco **plants**.
AUTHOR: Ma Qing-Hu Song Yan-Ru; Sun Jing-San
AUTHOR ADDRESS: Inst. Bot., Acad. Sinica, Beijing 100093**China
JOURNAL: Acta Botanica Sinica 38 (11):p870-874 **1996**
ISSN: 0577-7496
RECORD TYPE: Abstract
LANGUAGE: English
SUMMARY LANGUAGE: English; Chinese

ABSTRACT: The **expression** characteristics of a class of pathogenesis-related protein (PR) genes, namely basic chitinase, beta-1, 3-glucanase, osmotin and extensin. were studied in tobacco (Nicotiana tabacum cv. Wisconsin 38) **plants**. RNA blot hybridization showed

that these four genes were regulated in a developmental and organ-specific manner in tobacco. In the transgenic fascicular shoots which contained the active **cytokinin** biosynthetic gene (**ipt** gene) from Agrobacterium tumefaciens, the **expressions** of these four genes were co-regulated by overproduction of endogenous **cytokinins** and vector effect. **Cytokinins** reduced the **expressions** while vector effect induced the **expressions** of these four genes. Heat shock also decreased the steady-state levels of the four RNAs. These data suggest a complex regulation of PR genes.

1996

12/3,AB/29 (Item 14 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10887646 BIOSIS NO.: 199799508791
Auxin-**cytokinin** interactions in wild-type and transgenic tobacco.
AUTHOR: Eklof Staffan(a); Astot Crister(a); Blackwell John(a); Moritz Thomas(a); Olsson Olof; Sandberg Goran(a)
AUTHOR ADDRESS: (a)Dep. Forest Genetics and Plant Physiol., Swed. Univ. Agric. Sci., S-901 83 Umea**Sweden
JOURNAL: Plant and Cell Physiology 38 (3):p225-235 **1997**
ISSN: 0032-0781
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: **Cytokinins** and auxins are important regulators of **plant** growth and development, but there is incomplete and conflicting evidence that auxins affect **cytokinin** metabolism and vice versa. We have investigated these interactions in Nicotiana tabacum L. by separate in **planta** manipulation of levels of the hormones followed by analysis of the induced changes in the metabolism of the other hormone. **Cytokinin**-overproducing **plants** (**expressing** the Agrobacterium tumefaciens **ipt** gene) had lower than wild-type levels of free IAA, and reduced rates of IAA synthesis and turnover, but there were no differences in the profiles of metabolites they produced from fed IAA. Similarly, auxin-overproducing **plants** (**expressing** the A. tumefaciens iaaM and iaaH genes), had lower levels of the major **cytokinins** than wild-type **plants** and lower **cytokinin** oxidase activity, but there were no differences in the profiles of metabolites they produced from fed **cytokinins**. The data demonstrate that **cytokinin** or auxin overproduction decreases the content of the other hormone, apparently by decreasing its rate of synthesis and/or transport, rather than by increasing rates of turnover or conjugation. Implications for the importance of **cytokinin**:auxin ratios in **plant** development are considered.

1997

12/3,AB/30 (Item 15 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10807972 BIOSIS NO.: 199799429117
Molecular analysis of the virulence determinants of the phytopathogen Rhodococcus fascians.
AUTHOR: Vereecke Danny; Temmerman Wim; Maes Tania; Van Montagu Marc; Goethals Koen
AUTHOR ADDRESS: Lab. Genetica, Dep. Genet., Flanders Interuniversity Inst. Biotechnol., Univ. Gent, K.L. Ledeganckst**Belgium
JOURNAL: Mededelingen Faculteit Landbouwkundige en Toegepaste Biologische

Wetenschappen Universiteit Gent 61 (2A):p231-240 **1996**
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Most of the virulence determinants of the Gram-positive phytopathogen Rhodococcus fascians reside on a 200-kb linear plasmid, pFiD188. Three major groups of virulence genes can be distinguished on pFiD188. The fas locus contains six genes that encode proteins for cytochrome P450-linked electron transport and an **isopentenyl transferase**, the actions of which ultimately result in the formation of a hypermodified **cytokinin**. The att locus is a complex region of 20-kb that encompasses arginine biosynthetic genes and several genes related to polyketide biosynthesis; it probably encodes proteins for the formation of a complex molecule that would enhance susceptibility to infection or sensibility to suboptimal amounts of **cytokinins**. The third group of virulence genes contains regulatory proteins that are involved in control of the **expression** of fas and art both on the transcriptional and translational level. Besides these pFiD188-encoded loci one chromosomal virulence locus vic, was characterized. It is possibly involved in the catabolism of a gall specific compound that functions as a specialized carbon and nitrogen source for R. fascians.

1996

12/3,AB/31 (Item 16 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10788777 BIOSIS NO.: 199799409922
Regulation of **cytokinin** oxidase activity in tobacco callus **expressing** the T-DNA **ipt** gene.
AUTHOR: Redig Pascale; Motyka Vaclav; Van Onckelen Henri A; Kaminek Miroslav(a)
AUTHOR ADDRESS: (a)De Montfort Univ. Norman Borlaug Centre Plant Sci., Inst. Exp. Bot., Acad. Sci. Czech Republic, **Czech Republic
JOURNAL: Physiologia Plantarum 99 (1):p89-96 **1997**
ISSN: 0031-9317
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: There are indications that the **cytokinin** content in transgenic tissues **expressing** the **cytokinin** biosynthetic **ipt** gene is under metabolic control, which prevents the accumulation of **cytokinins** to lethal levels. The objective of this study was to investigate the relationships between the content of endogenous **cytokinins** and the activity of **cytokinin** oxidase (which is believed to be a copper-containing amine oxidase, EC 1.4.3.6.) in **ipt** transgenic tobacco callus. In addition, the effect of exogenously applied N-6-benzyladenine (BA) on this relationship was examined. Endogenous **cytokinin** concentrations were measured in callus of Nicotiana tabacum L. cv. Petit Havana SR1 transformed with the **ipt** of Agrobacterium tumefaciens under the control of a light-inducible promoter and in non-transformed tissue using LC-tandem mass spectrometry. The activity of **cytokinin** oxidase was estimated by measuring the conversion of (2,8-3H)N-6-(DELTA-2-isopentenyl)adenine to (3H)adenine by enzyme preparations in vitro. The 14-day-old **ipt** -transformed callus contained a 25-fold higher amount of **cytokinins** as compared to the non-transformed tissue. Mainly zeatin- and dihydrozeatin types of **cytokinins** (free bases, ribosides, nucleotides and O-glucosides) accumulated in the **ipt** transgenic tissue. The **cytokinin** pool of both **ipt**-transformed and non-transformed tissues consisted predominantly of **cytokinins** that are either resistant to **cytokinin** oxidase attack (nucleotides and

O-glucosides of **cytokinins** and **cytokinins** bearing N-6-saturated side chain) or have a low affinity for the enzyme (zeatin and its riboside). The former represented 71.6 and 74.8% and the latter 27.7 and 24.4% of the pool of endogenous **cytokinins** in **ipt** -transformed and non-transformed tissues, respectively. Enzyme preparations from **ipt**-transformed tissue exhibited 1.5-fold higher **cytokinin** oxidase activity compared with that observed in control tissues. Application of exogenous BA affected the total levels of **cytokinins** of the two tissue fines in different ways. The **cytokinin** content increased by 1.7- and 1.5-fold in **ipt** -transformed tissues 6 and 12 h after BA application, respectively, while it declined in the non-transformed control by 1.6- to 2.0-fold between 3 and 12 h after BA application. The increase in **cytokinin** content in the **ipt** callus is due to an increase of zeatin- and dihydrozeatin-type **cytokinins** (nucleotides, ribosides and free bases) leading to an enhanced accumulation of O-glucosides after 12 h. Following BA treatment, the **cytokinin** oxidase activity increased up to 1.8-fold in **ipt**-transformed and 1.6-fold in nontransformed tissues. The levels of isopentenyl-type **cytokinins** were near the detection limit; however, the enhancement of **cytokinin** oxidase activity after BA treatment in both tissue lines was correlated with the content of preferred substrate of the enzyme, N-6-(DELTA-2-isopentenyl)adenosine.

1997

12/3,AB/32 (Item 17 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10749434 BIOSIS NO.: 199799370579
Combined effects of auxin transport **inhibitors** and **cytokinin**: Alterations of organ development in tobacco.
AUTHOR: Strabala Timothy J; Wu Yan H; Li Yi(a)
AUTHOR ADDRESS: (a)Division Biol., Kansas State Univ., Manhattan, KS 66506-4901**USA
JOURNAL: Plant and Cell Physiology 37 (8):p1177-1182 **1996**
ISSN: 0032-0781
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: We have examined the effects of the auxin transport **inhibitors** 1-naphthylphthalamic acid (NPA) and 2,3,5-triiodobenzoic acid (TIBA) on leaf morphogenesis of transgenic Nicotiana tabacum (cv. Xanthi) **plants expressing** the Agrobacterium tumefaciens **cytokinin** biosynthetic gene, **ipt**. We have observed the formation of saucer-shaped leaf-like organs at the shoot apex and at lateral buds. The formation of apical saucer-shaped leaf-like organs can be duplicated by the application of exogenous NPA and **cytokinin** to wild-type tobacco seedlings. We have also observed adventitious leaf-like organs with altered petiole and blade morphology in the transgenic **plants** treated with auxin transport **inhibitors**. These results suggest that the combination of diminished auxin transport and elevated **cytokinin** can lead to alterations in leaf development in tobacco.

1996

12/3,AB/33 (Item 18 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10697808 BIOSIS NO.: 199799318953

Changes in **cytokinin** content and **cytokinin** oxidase activity in response to derepression of **ipt** gene transcription in transgenic tobacco calli and **plants**.
AUTHOR: Motyka Vaclav; Faiss Martin; Strnad Miroslav; Kaminek Miroslav; Schmuelling Thomas(a)
AUTHOR ADDRESS: (a)Universitaet Tuebingen, Lehrstuhl fuer Allgemeine Genetik, Auf der Morgenstelle 28, D-72076 Tueb**Germany
JOURNAL: Plant Physiology (Rockville) 112 (3):p1035-1043 **1996**
ISSN: 0032-0889
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Metabolic control of **cytokinin** oxidase by its substrate was investigated in **planta** using wild-type (WT) and conditionally **ipt** gene-**expressing** transgenic (**IPT**) tobacco (Nicotiana tabacum L.) callus cultures and **plants**. The derepression of the tetracycline (Tc)-dependent **ipt** gene transcription was followed by a progressive, more than 100-fold increase in total **cytokinin** content in **IPT** calli. The activity of **cytokinin** oxidase extracted from these calli began to increase 16 to 20 h after gene derepression, and after 13 d it was 10-fold higher than from Tc-treated WT calli. An increase in **cytokinin** oxidase activity, as a consequence of elevated **cytokinin** levels, was found in detached leaves (8-fold after 4 d) and in roots of intact **plants** (4-fold after 3 d). The partially purified **cytokinin** oxidase from WT, repressed **IPT**, and Tc-derepressed **IPT** tobacco calli exhibited similar characteristics. it had the same broad pH optimum (pH 6.5-8.5), its activity in vitro was enhanced 4-fold in the presence of copper-imidazole, and the apparent K-m(N-6-(DELTA-2isopentenylladenine) values were in the range of 3.1 to 4.9 mu-M. The increase in **cytokinin** oxidase activity in **cytokinin**-overproducing tissue was associated with the accumulation of a glycosylated form of the enzyme. The present data indicate the substrate induction of **cytokinin** oxidase activity in different tobacco tissues, which may contribute to hormone homeostasis.

1996

12/3,AB/34 (Item 19 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10639343 BIOSIS NO.: 199699260488
Cytokinin metabolites and gradients in wild type and transgenic tobacco with moderate **cytokinin** over-production.
AUTHOR: Ekloff Staffan; Astot Crister; Moritz Thomas; Blackwell John; Olsson Olof; Sandberg Goran(a)
AUTHOR ADDRESS: (a)Dep. Forest Genetics Plant Physiol., Swed. Univ. Agric. Sch., S-901 85 Umea**Switzerland
JOURNAL: Physiologia Plantarum 98 (2):p333-344 **1996**
ISSN: 0031-9317
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: A binary T-DNA **plant expression** vector carrying a promoterless **isopentenyl transferase** (**ipt**) gene was constructed and used to transform Nicotiana tabacum L. Several primary transformants were obtained that displayed a range of phenotypes characteristic of **cytokinin** over-production. Two of the transformants with moderately altered phenotypes, both of which produced viable offspring and **expressed** the **ipt** gene at a low level, were selected for use in studies of the regulation of **cytokinin**

metabolism. Both lines were found to contain high concentrations of zeatin-7-glucoside (Z7G), indicating that Z7G can accumulate in **plants** even when the rate of endogenous overproduction of **cytokinins** is low. This supports the hypothesis that 7-glucosidation is an important step in the regulation of zeatin (Z) levels. Very sharp gradients in concentration of **cytokinin** riboside and ribotides, related to age of tissue and distance from the apex, were found in both wild type and transformed **plants**, which could be important in developmental regulation and could also account for some of the discrepancies between reported **cytokinin** levels in various **plants**. Intriguingly, however, although the combined level of zeatin riboside and ribotide was much higher in the transformed **plants** than in wild type, the combined level of **isopentenyl** riboside and ribotide was lower.

1996

12/3,AB/35 (Item 20 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10616456 BIOSIS NO.: 199699237601
Analysis of **cytokinin** metabolism in **ipt** transgenic tobacco by liquid chromatography-tandem mass spectrometry.
AUTHOR: Redig Pascale(a); Schmuelling Thomas; Van Onckelen Harry
AUTHOR ADDRESS: (a)Univ. Antwerp, Dep. Biol., Universiteitsplein 1, B-2610 Antwerpen, Belgium**Germany
JOURNAL: Plant Physiology (Rockville) 112 (1):p141-148 **1996**
ISSN: 0032-0889
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The endogenous levels of the major, naturally occurring **cytokinins** in Pisum sativum ribulose-1,5-bisphosphate carboxylase small subunit promoter-**isopentenyl transferase** gene (Pssu-**ipt**)-transformed tobacco (Nicotiana tabacum L.) callus were quantified using electrospray-liquid chromatography-tandem mass spectrometry during a 6-week subcultivation period. An **ipt** gene was **expressed** under control of a tetracycline-inducible promoter for a more detailed study of **cytokinin** accumulation and metabolism. Activation of the **ipt** in both **expression** systems resulted in the production of mainly zeatin-type **cytokinins**. No accumulation of isopentenyladenine or isopentenyladenosine was observed. in Pssu-**ipt**-transformed calli, as well as in the tetracycline-inducible **ipt** leaves, metabolic inactivation occurred through O-glucoside conjugation. No significant elevation of **cytokinin** N-glucosides levels was observed. Side-chain reduction to dihydrozeatin-type **cytokinins** was observed in both systems. The levels of the endogenous **cytokinins** varied in time and were subject to homeostatic regulatory mechanisms. Feeding experiments of **ipt** transgenic callus with (3H)isopentenyladenine and (3H)isopentenyladenosine mainly led to labeled adenine-like compounds, which are degradation products from **cytokinin**-oxidase activity. Incorporation of radioactivity in zeatin riboside was observed, although to a much lesser extent.

1996

12/3,AB/36 (Item 21 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10512938 BIOSIS NO.: 199699134083
Chemically induced **expression** of the rolC-encoded beta-glucosidase in transgenic tobacco **plants** and analysis of **cytokinin** metabolism: rolC does not hydrolyze endogenous **cytokinin** glucosides in **planta**.
AUTHOR: Faiss Martin; Strand Miroslav; Redig Pascale; Dolezal Karel; Hanus Jan; Van Onckelen Harry; Schmuelling Thomas(a)
AUTHOR ADDRESS: (a)Univ. Tuebingen, Lehrstuhl fuer Allgemeine Genetik, Auf der Morgenstelle 28, D-72076 Tuebingen**Germany
JOURNAL: Plant Journal 10 (1):p33-46 **1996**
ISSN: 0960-7412
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The rolC gone of Agrobacterium rhizogenes T-DNA plays an essential role in the establishment of hairy root disease and its overexpression in transgenic **plants** causes pleiotropic developmental alterations. This study investigated whether the biological activity of the rolC beta-glucosidase is due to an alteration of the **cytokinin** balance in **plants**. HPLC radiocounting assays of (3H)-labeled **cytokinin** glucosides fed exogenously to tobacco leaf disks, to rolC **expressing** Escherichia coli cells or cell-free extracts showed that **cytokinin** N3- and O-glucosides are the preferred substrate of the rolC protein. Hydrolysis of N7- and N9-glucosides was not detected at substrate concentrations close to physiological levels. Furthermore, these conjugates were also not active as **cytokinins** in biotests when fed to rolC-**expressing** tissues. For analysis of the rolC activity on endogenous **cytokinin** conjugates the gone was **expressed** under the transcriptional control of a modified tetracycline-inducible 35S promoter. This was done to avoid possible interference with secondary effects or **plant** homeostatic mechanisms which could mask primary in **plants** events when transgenes are **expressed** constitutively. No changes in the endogenous pool of different **cytokinin** glucosides, as determined by a newly developed electrospray tandem mass spectroscopy directly coupled to high performance liquid chromatography, were found following chemical induction of the rolC gone. Also the levels of free **cytokinins** remained unchanged after gone induction. Hybrid tobacco **plants** **expressing** the **cytokinin**-synthezising **ipt** gone and the rolC gone showed added phenotypes indicating that the rolC phenotype is mediated on a signalling pathway different from those of **cytokinins** . Rolc/**ipt** hybrids also accumulated high levels of **cytokinin** O-glucosides. It is concluded that the phenotypic alterations caused by the rolC gone product are not due to a release of free **cytokinins** from inactive conjugates, most likely because of subcellular compartmentation of the putative substrate.

1996

12/3,AB/37 (Item 22 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10424627 BIOSIS NO.: 199699045772
Cytokinin and IAA content in tobacco regenerations carrying the active Agrobacterium **ipt** gene.
AUTHOR: Makarova R V; Borisova T A; Kefeli V I
AUTHOR ADDRESS: K.A. Timiryazev Inst. Plant Physiol., Russ. Acad. Sci., Moscow**Russia
JOURNAL: Doklady Akademii Nauk 346 (2):p280-283 **1996**
ISSN: 0869-5652

DOCUMENT TYPE: Article
RECORD TYPE: Citation
LANGUAGE: Russian; Non-English
1996

12/3,AB/38 (Item 23 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10369360 BIOSIS NO.: 199698824278
Analysis of **cytokinin** biosynthetic gene **expression** in transgenic tobacco **plants**.
AUTHOR: Ma Qing-Hu
AUTHOR ADDRESS: Inst. Bot., Acad. Sinica, Beijing 100044**China
JOURNAL: Chinese Journal of Botany 7 (2):p104-108 **1995**
ISSN: 1001-0718
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The **cytokinin** biosynthetic gene coding for **isopentenyl transferase** (**ipt**) was cloned with its native promoter from Agrobacterium tumefaciens pTiAch58 and introduced into tobacco **plants**. To overcome the elevated **cytokinin** levels in suppressing the formation of roots, indolebutyric acid (IBA) was applied to regenerate morphologically normal transgenic tobacco **plants**. Northern hybridization revealed that the **ipt** mRNA level in these rooting **plants** were much lower than those in the primary transformed turnout tissues, and the root was the part in which the **ipt** gene mRNA level was the lowest in the **plant**. The determination of endogenous zeatin and zeatin riboside levels gave the same trend with the northern hybridization. These data suggest that the transgenic **plants** we obtained are a good model for studying the function and regulation of **cytokinin** in the whole **plant** levels.

1995

12/3,AB/39 (Item 24 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10342649 BIOSIS NO.: 199698797567
Agrobacterium-mediated transformation of apple (Malus x domestica Borkh.): An assessment of factors affecting regeneration of transgenic **plants**.
AUTHOR: De Bondt An; Eggermont Kristel; Penninckx Iris; Goderis Inge; Broekaert Willem F(a)
AUTHOR ADDRESS: (a)F.A. Janssens, Laboratorium voor Genetica, Katholieke Universiteit Leuven, Willem de Croylaan 42**Belgium
JOURNAL: Plant Cell Reports 15 (7):p549-554 **1996**
ISSN: 0721-7714
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: We have previously developed a protocol for efficient gene transfer and regeneration of transgenic calli following cocultivation of apple (cv. Jonagold) explants with Agrobacterium tumefaciens (De Bondt et al. 1994, **Plant** Cell Reports 13: 587-593). Now we report on the optimization of postcultivation conditions for efficient and reproducible regeneration of transgenic shoots from the apple cultivar Jonagold.

Factors which were found to be essential for efficient shoot regeneration were the use of gelrite as a gelling agent and the use of the **cytokinin**-mimicing thidiazuron in the selective postcultivation medium. Improved transformation efficiencies were obtained by combining the hormones thidiazuron and zeatin and by using leaf explants from in vitro grown shoots not older than 4 weeks after multiplication. Attempts to use phosphinothricin acetyl **transferase** as a selectable marker were not successful. Using selection on kanamycin under optimal postcultivation conditions, about 2% of the leaf explants developed transgenic shoots or shoot clusters. The presence and **expression** of the transferred genes was verified by beta-glucuronidase assays and Southern analysis. The transformation procedure has also been successfully applied to several other apple cultivars.

1996

12/3,AB/40 (Item 25 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10289005 BIOSIS NO.: 199698743923
Effect of heat shock on the dynamics of **cytokinin** concentration in transgenic and intact tobacco **plants**.
AUTHOR: Veselov S Yu; Kudoyarova G R(a); Mustafina A R; Valcke R
AUTHOR ADDRESS: (a)Inst. Biol., Ufa Res. Cent., Russ. Acad. Sci., prospekt Oktyabrya 69, 450054 Ufa**Russia
JOURNAL: Fiziologiya Rastenii (Moscow) 42 (5):p696-699 **1995**
ISSN: 0015-3303
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: Russian; Non-English
SUMMARY LANGUAGE: Russian; Non-English

ABSTRACT: The daily dynamics of the concentration of endogenous **cytokinins** was determined in transgenic Nicotiana tabacum shoots. In these **plants**, the **expression** of **ipt**-gene controlling isopentenyltransferase synthesis was induced by heat shock. Incubation of transgenic **plants** during one hour at 40 degree C resulted in an increase in endogenous **cytokinin** concentration as compared to the control transgenic **plants** constantly exposed to the temperature of 24 degree C. However, this increase lasted only for a short period of time and no differences were observed between the experimental and control **plants** 5 hours after the effect of heat shock. In the shoots of intact **plant** seedlings, heat shock induced the activation of processes focused at a decrease in **cytokinin** concentration. This phenomenon can be considered a natural reaction of **plants** to heat-induced stress. The realization of this natural reaction in transgenic **plants** can be a reason for a short duration of **cytokinin** accumulation induced by heat shock.

1995

12/3,AB/41 (Item 26 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10199993 BIOSIS NO.: 199698654911
Cytokinin oxidase-purification by affinity chromatography and activation by caffeic acid.
AUTHOR: Wang J; Letham D S(a)
AUTHOR ADDRESS: (a)Cooperative Res. Cent. Plant Sci., Res. Sch. Biol. Sci., Australian Natl. Univ., P.O. Box 475, C**Australia

JOURNAL: Plant Science (Shannon) 112 (2):p161-166 **1995**
ISSN: 0168-9452
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Two **cytokinin** analogues, 6-di-(isopent-2-enyl)aminopurine and 6-(N-isopent-2-enyl-N-methylamino)purine were found to be effective **inhibitors** of **cytokinin** oxidase prepared from tobacco tissue cultures **expressing** the **cytokinin** biosynthesis gene **ipt** . The latter analogue was conjugated at the N-9 position to Sepharose through a 12-atom spacer moiety. This yielded a matrix for preparation of an affinity column for further purification of **cytokinin** oxidase that had been partially purified by other methods. The activity of **cytokinin** oxidase was enhanced by caffeic acid and to a lesser extent by other phenolic compounds tested.

1995

12/3,AB/42 (Item 27 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10157530 BIOSIS NO.: 199698612448
The effect of an elevated **cytokinin** level using the **ipt** gene and N-6-benzyladenine on single node and intact **plant** tuberization in vitro.
AUTHOR: Galis Vvan Jiri Macas(a); Vlasak Josef; Ondrej Milos; Van Onckelen Henri A
AUTHOR ADDRESS: (a)Inst. Plant Molecular Biol., Acad. Sci., Czech Republic, Branisovska 31, 370 05 Ceske Budejovice**Czech Republic
JOURNAL: Journal of Plant Growth Regulation 14 (3):p143-150 **1995**
ISSN: 0721-7595
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Two models of potato (Solanum tuberosum L.) tuberization in vitro (intact **plants** and single nodes) were used to study the role of **cytokinins** in this process. We applied hormone in two different ways. The exogenous addition of 10 mg cntdot L-1 N-6-benzyladenine (BA) into the tuberization medium resulted in advanced tuber formation in intact **plants**, and microtubers appeared 10-20 days earlier than in the experiments in which no **cytokinin** was supplied. Transformation with the Agrobacterium tumefaciens **ipt** gene provided potato clones with endogenously elevated **cytokinin** levels (3-20 times higher zeatin riboside content in different clones). The onset of tuberization in intact **ipt**-transformed **plants** with low transgene **expression** was advanced in comparison with control material, and exogenously applied BA further promoted the tuberization process. On the contrary, tuberization was strongly **inhibited** in **ipt** -transformed nodes, and an external increase of the **cytokinin** level caused complete **inhibition** of explant growth. In untransformed (control) nodes **cytokinin** application resulted in primary and secondary tuber formation, which depended on the BA concentration in cultivation media.

1995

12/3,AB/43 (Item 28 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

10003903 BIOSIS NO.: 199598458821
Expression of a wound-inducible **cytokinin** biosynthesis gene in transgenic tobacco: Correlation of root **expression** with induction of **cytokinin** effects.
AUTHOR: Smigocki Ann C
AUTHOR ADDRESS: Plant Molecular Biology Lab., USDA/ARS, 10300 Baltimore Ave., Build. 006, Room 118, Beltsville, MD 2**USA
JOURNAL: Plant Science (Limerick) 109 (2):p153-163 **1995**
ISSN: 0168-9452
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The Agrobacterium-derived **cytokinin**-biosynthesis gene **ipt** was fused to the wound-inducible proteinase-**inhibitor**-IIK gene promoter from potato and introduced into Nicotiana plumbaginifolia and N. tabacum. Maximum accumulation of **ipt** transcripts in the leaves of transgenic **plants** was observed within 3-24 h after leaf wounding. Root and stem **ipt** messages were not detected in unwounded transgenic N. plumbaginifolia PI-II-**ipt** seedlings until after the **plants** bolted whereas in N. tabacum, a relatively low level of root and stem **expression** was evident only prior to stem elongation and not detected after the **plants** bolted. Atypical **cytokinin** effects were observed with the N. plumbaginifolia but not N. tabacum transformants. Transgenic N. plumbaginifolia **plants** bolted sooner, were taller than control **plants** and had larger leaves with lower specific fresh weights and chlorophyll content. At flowering, the emergence of numerous lateral shoots from lower stem sections and basal leaf greening followed the moderate increase in root **ipt** transcripts and corresponded to a greater than 100-fold increase in zeatin and zeatinriboside **cytokinin** concentrations. The **expression** pattern of the PI-II-**ipt** gene followed that of the PI-IIK gene and, when **expressed** in the root, corresponded with induction of characteristic **cytokinin** effects.

1995

12/3,AB/44 (Item 29 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09975304 BIOSIS NO.: 199598430222
Effect of Auxin on **Expression** of the **Isopentenyl Transferase** Gene (**ipt**) in Transformed Bean (Phaseolus vulgaris L.) Single-Cell Clones Induced by Agrobacterium tumefaciens C58.
AUTHOR: Song Jai Young; Choi Eun Yeung; Lee Hyeun Se; Choi Dong-Woog; Oh Man-Ho; Kim Sang-Gu(a)
AUTHOR ADDRESS: (a)Dep. Biol. Res. Cent. Cell Differentiation, Seoul Natl. Univ., Seoul 151-742**South Korea
JOURNAL: Journal of Plant Physiology 146 (1-2):p148-154 **1995**
ISSN: 0176-1617
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The effect of auxin on the endogenous **cytokinin** content and on the **expression** of **isopentenyl transferase** gene (**ipt**) was investigated in bean (Phaseolus vulgaris L. cv. Palgong) tumor single-cell clones induced by Agrobacterium tumefaciens C58. The major endogenous **cytokinins** of tumor single-cell clones were zeatin and zeatin riboside. Endogenous zeatin and zeatin riboside levels in tumor single-cell clones cultured on an auxin-supplemented medium were

reduced by six-fold and eight-fold, respectively, while tumor single-cell clones cultured on the 5.0 mu-M kinetin-supplemented medium did not exhibit any reduction in the levels of these **cytokinins**. The mRNAs isolated from normal single-cell clones cultured on 5.0 mu-M kinetin and 2.5 mu-M picloram-supplemented medium, from transformed single-cell clones cultured on hormone-free medium, and from transformed single-cell clones cultured on 2.5 mu-M picloram-supplemented medium, were subjected to Northern blot hybridization. The **ipt** transcript was not detected in tumor single-cell clones cultured on picloram-supplemented medium, but the **ipt** mRNA was detected in tumor single-cell clones cultured on hormone-free medium. The amount of **ipt** mRNA in tumor single-cell clones was found to decrease with time in cultures grown on picloram-supplemented medium. The nopaline synthase gene (nos) transcript was detected in the tumor single-cell clones from both culture conditions. It is concluded that picloram regulates the **ipt** mRNA steady state level, either at the transcriptional level or by affecting **ipt** mRNA stability.

1995

12/3,AB/45 (Item 30 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09832302 BIOSIS NO.: 199598287220
The effect of auxin on **cytokinin** levels and metabolism in transgenic tobacco tissue **expressing** an **ipt** gene.
AUTHOR: Zhang R; Zhang X; Wang J; Letham D S(a); McKinney S A; Higgins T J V
AUTHOR ADDRESS: (a)Cooperative Res. Cent. Plant Sci., Australian Natl. Univ., PO Box 475, Canberra, ACT 2601**Australia
JOURNAL: Planta (Heidelberg) 196 (1):p84-94 **1995**
ISSN: 0032-0935
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The **ipt** gene from the T-DNA of Agrobacterium tumefaciens was transferred to tobacco (Nicotiana tabacum L.) in order to study the control which auxin appears to exert over levels of **cytokinin** generated by **expression** of this gene. The transgenic tissues contained elevated levels of **cytokinins**, exhibited **cytokinin** and auxin autonomy and grew as shooty calli on hormone-free media. Addition of 1-naphthylacetic acid to this culture medium reduced the total level of **cytokinins** by 84% while 6-benzylaminopurine elevated the **cytokinin** level when added to media containing auxin. The **cytokinins** in the transgenic tissue were labelled with 3H and auxin was found to promote conversion of zeatin-type **cytokinins** to 3H-labelled adenine derivatives. When the very rapid metabolism of exogenous (3H)zeatin riboside was suppressed by a phenylurea derivative, a noncompetitive **inhibitor** of **cytokinin** oxidase, auxin promoted metabolism to adenine-type compounds. Since these results indicated that auxin promoted **cytokinin** oxidase activity in the transformed tissue, this enzyme was purified from the tobacco tissue cultures. Auxin did not increase the level of the enzyme per unit tissue protein, but did enhance the activity of the enzyme in vitro and promoted the activity of both glycosylated and non-glycosylated forms. This enhancement could contribute to the decrease in **cytokinin** level induced by auxin. Studies of **cytokinin** biosynthesis in the transgenic tissues indicated that transhydroxylation of isopentenyladenine-type **cytokinins** to yield zeatin-type **cytokinins** occurred principally at the nucleotide level.

1995

12/3,AB/46 (Item 31 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09765648 BIOSIS NO.: 199598220566
Increase of endogenous zeatin riboside by introduction of the **ipt** gene in wild type and the lateral suppressor mutant of tomato.
AUTHOR: Groot Steven P C(a); Bouwer Reinoud(a); Busscher Marco(a); Lindhout Pim; Dons Hans J(a)
AUTHOR ADDRESS: (a)Dep. Dev. Biol., Cent. Plant Breed. Reprod. Res., P.O. Box 16, NL-6700 AA Wageningen**Netherlands
JOURNAL: Plant Growth Regulation 16 (1):p27-36 **1995**
ISSN: 0167-6903
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: We studied axillary meristem formation of the lateral suppressor (ls) mutant of tomato after elevating the endogenous **cytokinin** levels through introduction of the isopentenyltransferase (**ipt**) gene from Agrobacterium tumefaciens. Growth and development of several transformants were examined during in vitro culture. Transformants exhibited phenotypes varying in severity and were divided into four classes. A number of the **ipt** transformants had a normal phenotype, as non-transformed **plants**. Others showed a mild to severe ' **cytokinin**-like' phenotype. Transformants with a mild phenotype exhibited reduced internode length and reduced root development. Transformants with a severe phenotype showed even shorter internodes, loss of apical dominance, reduction of leaf size, production of callus at the basis of the shoots and absence of root development or development of green non-branching roots. The severity of the phenotype correlated well with the level of **ipt** gene **expression**, as measured by northern analysis. Transformants with a severe phenotype also exhibited increased levels of zeatin riboside, but zeatin levels were not elevated. The increase in endogenous zeatin riboside levels in the ls mutant did not restore axillary meristem formation, but sometimes bulbous structures were formed in the initially 'empty' leaf axils. Several adventitious meristems and shoots developed from below the surface of these structures. It is concluded that a reduced level of **cytokinins** in the ls mutant shoots is not responsible for the absence of axillary meristem formation.

1995

12/3,AB/47 (Item 32 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09716852 BIOSIS NO.: 199598171770
Production of high solids tomatoes through molecular modification of levels of the **plant** growth regulator **cytokinin**.
AUTHOR: Martineau Belinda(a); Summerfelt Kristin R; Adams Dawn F; Deverna Joseeph W
AUTHOR ADDRESS: (a)Calgene Inc., 1920 Fifth St., Davis, CA 95616**USA
JOURNAL: Bio-Technology (New York) 13 (3):p250-254 **1995**
ISSN: 0733-222X
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Chimeric **isopentenyl transferase** (**ipt**) gene constructs were prepared and introduced into tomato **plants** via Agrobacterium-mediated transformation. **Expression** of the **ipt** gene, which encodes a key enzyme involved in the biosynthesis of the **plant** growth regulator **cytokinin**, was **modulated** using a promoter from a gene **expressed** primarily in tomato ovaries. As expected, the **ipt** gene was **expressed**, and levels of **cytokinin** were increased, in ovaries of the transgenic **plants** . **Plant** yield and fruit processing characteristics of these transgenic **plants** were examined during three consecutive years of field testing. Levels of total solids were significantly increased in six of seven, and soluble solids were significantly increased in five of seven, independent transgenic tomato lines.

1995

12/3,AB/48 (Item 33 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09536881 BIOSIS NO.: 199497545251
Specific **expression** of **isopentenyl transferase** gene in transgenic tobacco.
AUTHOR: Ma Qin-Hu(a); Zhang; Ren; Higgins Thomas J V
AUTHOR ADDRESS: (a)Inst. Botany, Acadmia Sinica, Beijing 100044**China
JOURNAL: Acta Botanica Sinica 36 (5):p339-344 **1994**
ISSN: 0577-7496
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: Chinese; Non-English
SUMMARY LANGUAGE: Chinese; English

ABSTRACT: The **cytokinin** biosynthetic gene, **isopentenyl transferase** (**ipt**) gene of Agrobacterium tumefaciens was fused to a petunia ribulose bisphosphate carboxylase small subunit (SSU301) promoter and introduced into tobacco **plants**. The **expression** pattern of this chimeric SSU-**ipt** gene was studied in the transgenic **plants**, and the endogenous levels of **cytokinins** were determined. It was revealed that **ipt** mRNA level was increased in light-cultured transgenic tobacco tissues, but was undetectable in dark cultured condition. The levels of zeatin and zeatin riboside in the transgenic tissues in light increased about 10 times as compared with the tissues in dark. The results show that the petunia SSU301 promoter can specifically direct the **expression** of the **ipt** gene in the transgenic tobacco. These SSU-**ipt** gene transgenic tobacco **plants** will provide valuable materials for studies of **cytokinin**'s functions in phytosynthetic tissues and in the light-related physiological processes.

1994

12/3,AB/49 (Item 34 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09446154 BIOSIS NO.: 199497454524
Transgenic tobacco **plants** that overproduce **cytokinins** show increased tolerance to exogenous auxin and auxin transport **inhibitors**.
AUTHOR: Li Yi; Shi Xiangyang; Strabala Timothy J; Hagen Gretchen; Guilfoyle Tom J(a)
AUTHOR ADDRESS: (a)Dep. Biochem., 117 Schweitzer Hall, Univ. Missouri,

Columbia, MO 65211**USA
JOURNAL: Plant Science (Limerick) 100 (1):p9-14 **1994**
ISSN: 0168-9452
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Transgenic tobacco **plants expressing** the Agrobacterium tumefaciens **cytokinin** biosynthetic **ipt** gene under the control of an auxin-inducible SAUR (Small Auxin-Up RNA) gene promoter were used to study interactions between exogenously applied auxins or auxin transport **inhibitors** and endogenously produced **cytokinins**. The transgenic **plants** used in this study had **cytokinin** levels about 10-fold higher than non-transformed tobacco **plants**. In aseptic culture, the transgenic tobacco **plants** exhibited increased tolerance to the toxic effects of high concentrations of exogenously applied auxins. This tolerance is exemplified by increased **plant** height and fresh weight in transgenic **plants** treated with auxin compared to similarly treated non-transformed **plants**. In addition to increased tolerance to exogenous auxins, the transgenic **plants** showed increased tolerance to applied auxin transport **inhibitors**.

1994

12/3,AB/50 (Item 35 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09380286 BIOSIS NO.: 199497388656
Phenotype modification and disease resistance via regulated **expression** of the **cytokinin** biosynthesis gene.
AUTHOR: Smigocki Ann C
AUTHOR ADDRESS: Plant Mol. Biol. Lab., ARS/USDA, Beltsville, MD 20705-2350 **USA
JOURNAL: Hortscience 29 (5):p574 **1994**
CONFERENCE/MEETING: 91st Annual Meeting of the American Society for Horticultural Science Corvallis, Oregon, USA August 7-10, 1994
ISSN: 0018-5345
RECORD TYPE: Citation
LANGUAGE: English
1994

12/3,AB/51 (Item 36 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09344903 BIOSIS NO.: 199497353273
Osmotic stress symptoms in transgenic tobacco **expressing ipt** from A. tumefaciens.
AUTHOR: Thomas John C(a); Smigocki Ann C; Bohnert Hans J
AUTHOR ADDRESS: (a)Dep. Biochem., Univ. Arizona, Tucson, AZ 85721**USA
JOURNAL: Plant Physiology (Rockville) 105 (1 SUPPL.):p71 **1994**
CONFERENCE/MEETING: Annual Meeting of the American Society of Plant Physiologists Portland, Oregon, USA July 30-August 3, 1994
ISSN: 0032-0889
RECORD TYPE: Citation
LANGUAGE: English
1994

12/3,AB/52 (Item 37 from file: 5)

DIALOG(R)File 5:Biosis Previews(R)

09261434 BIOSIS NO.: 199497269804
Fruit-specific **expression** of the A. tumefaciens **isopentenyl transferase** gene in tomato: Effects on fruit ripening and defense-related gene **expression** in leaves.
AUTHOR: Martineau Belinda(a); Houck Catherine M; Sheehy Raymond E; Hiatt William R
AUTHOR ADDRESS: (a)Calgene Fresh Inc., 1910 Fifth St., David, CA 95616**USA
JOURNAL: Plant Journal 5 (1):p11-19 **1994**
ISSN: 0960-7412
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: This paper describes the analysis of tomato **plants** transformed with a chimeric gene consisting of the promoter region of a fruit specifically **expressed** tomato gene linked to the **ipt** gene coding sequences from the Ti plasmid of Agrobacterium tumefaciens. The pattern of **expression** of this chimeric gene was found to be consistent with the **expression** of the endogenous fruit-specific gene and consequently, **plants expressing** the chimeric gene were phenotypically normal until fruit maturation and ripening. A dramatically altered fruit phenotype, islands of green pericarp tissue remaining on otherwise deep red ripe fruit, was then evident in many of the transformed **plants**. **Cytokinin** levels in transformed **plant** fruit tissues were 10 to 100-fold higher than in control fruit. In the leaves of a fruitbearing transformant, despite a lack of detectable **ipt** mRNA accumulation, approximately fourfold higher than control leaf levels of **cytokinin** were detected. It is suggested that **cytokinin** produced in fruit is being transported to the leaves since accumulation in leaves of PR-1 and chitinase mRNAs, which encode defense-related proteins known to be induced by **cytokinin**, occurred only when the transformant was reproductively active. Effects of elevated **cytokinin** levels on tomato fruit gene **expression** and cellular differentiation processes are also described.

1994

12/3,AB/53 (Item 38 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09188845 BIOSIS NO.: 199497197215
Cytokinins modulate stress response genes in **isopentenyl transferase**-transformed Nicotiana plumbaginifolia **plants**.
AUTHOR: Harding S A; Smigocki A C(a)
AUTHOR ADDRESS: (a)Plant Mol. Biol. Lab., USDA/ARS Beltsville, MD 20705** USA
JOURNAL: Physiologia Plantarum 90 (2):p327-333 **1994**
ISSN: 0031-9317
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The effects of transiently elevated **cytokinin** levels on gene **expression** following stress were examined in transgenic Nicotiana plumbaginifolia **plants**. **Plants** were transformed with a bacterial gene encoding **isopentenyl transferase** (**ipt**) cloned behind the heat shock (HS) protein 70 promoter from Drosophila melanogaster. Following a 1-h, 45 degree C HS of whole

plants, the **ipt** transcript levels in leaves increased 30- to 40-fold. Analysis of in vitro translation products of leaf messenger RNA showed rapid **isopentenyl transferase**-dependent changes in gene **expression**. A subset comprising 1 to 2% of resolvable translation products was specifically up-regulated in heat shock **ipt**-inducible (HS-**ipt**) **plants**. Several cDNA clones were isolated which correspond to mRNAs that are up-regulated 2- to 4-fold in HS-**ipt plants**. Two of the cDNAs encode stress-related polypeptides, one a member of a class of small heat shock polypeptides (HSP) and the other, a wound-inducible glycine-rich protein. Benzylaminopurine feeding experiments show that the HSP transcripts are up-regulated by other treatments including watering but that **cytokinins** strongly accelerate or amplify the response. These data are the first to show altered **modulation** of stress-induced genes in intact **plants** transformed with the **cytokinin** biosynthesis gene **ipt**.

1994

12/3,AB/54 (Item 39 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09138338 BIOSIS NO.: 199497146708
The role of hormones in apical dominance. New approaches to an old problem in **plant** development.
AUTHOR: Cline Morris G
AUTHOR ADDRESS: Dep. Plant Biol., Ohio State Univ., 1735 Neil Ave., Columbus, OH 43210**USA
JOURNAL: Physiologia Plantarum 90 (1):p230-237 **1994**
ISSN: 0031-9317
DOCUMENT TYPE: Literature Review
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The role of hormones in apical dominance has been under investigation with traditional 'spray and weigh' methods for nearly 5 decades. Even though the precision of hormone content analyses in tissue has greatly improved in recent years, there have been no significant breakthroughs in our understanding of the action mechanism of this classical developmental response. Auxin appears to **inhibit** axillary bud outgrowth whereas **cytokinins** will often promote it. Conclusive evidence for a direct role of these or other hormones in apical dominance has not been forthcoming. However, promising new tools and approaches recently have begun to be utilized. The manipulation of endogenous hormone levels via the use of transgenic **plants** transformed with bacterial genes (iaaM and **ipt** from Agrobacterium tumefaciens and iaaL from Pseudomonas syringae pv. savastanoi) has demonstrated powerful effects of auxin and **cytokinin** on axillary bud outgrowth. Also, possible auxin and **cytokinin** involvement of rolB and C genes from Agrobacterium rhizogenes whose activity is associated with reduced apical dominance in dicotyledons has received considerable attention. The characterization of unique mRNAs and proteins in non-growing and growing lateral buds before and after apical dominance release is helping to lay the groundwork for the elucidation of signal transduction and cell cycle regulation in this response. The use of auxin-deficient, and auxin/ethylene-resistant mutants has provided another approach for analyzing the role of these hormones. The presumed eventual employment of molecular assay systems (SAUR/GH3 promoters fused with GUS reporter gene) which are presently being developed for analyzing auxin localized in lateral buds will hopefully provide a critical test for the direct auxin **inhibition** hypothesis.

1994

12/3,AB/55 (Item 40 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09081205 BIOSIS NO.: 199497089575
Morphometric analysis of the growth of Phsp70-**ipt** transgenic tobacco **plants**.
AUTHOR: Van Loven Karen; Beinsberger Susy E I; Valcke Roland L M(a); Van Onckelen Henri A; Clijsters Herman M M
AUTHOR ADDRESS: (a)Limburgs Universitair Centrum, Dept. SBG, Universitaire Campus, B-3590 Diepenbeek**Belgium
JOURNAL: Journal of Experimental Botany 44 (268):p1671-1678 **1993**
ISSN: 0022-0957
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: The effect of introducing a supplementary **ipt**-gene into the genome of Nicotiana tabacum L. cv. Petit Havana SR1 is studied on the morphological **plant** development. The **ipt**-gene, accounting for the biosynthesis of **cytokinins**, was coupled to the heat-inducible hsp70- promoter from Drosophila melanogaster. Besides the influence of the hormonal changes involved, the effects of the experimental conditions are examined, namely the in vitro growth conditions for selecting transformed **plants** and the heat treatment to induce **ipt**-gene **expression**. The phenotype of the **plants** is determined by the tissue sensitivity to three factors: (1) heat treatment reduces stem elongation and diameter growth; (2) in vitro pre-cultivation also reduces stem elongation; and (3) **expression** of the **ipt**-gene stimulates diameter growth, induces debudding of the axillary shoots and **inhibits** root development. In addition, axillary bud development indicates that in vitro cultivation affects **ipt**-gene **expression**.

1993

12/3,AB/56 (Item 41 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

09042189 BIOSIS NO.: 199497050559
Alterations in auxin and **cytokinin** metabolism of higher **plants** due to **expression** of specific genes from pathogenic bacteria: A review.
AUTHOR: Hamill John D
AUTHOR ADDRESS: Dep. Genet. Dev. Biol., Monash Univ., Clayton, VIC 3168** Australia
JOURNAL: Australian Journal of Plant Physiology 20 (4-5):p405-423 **1993**
ISSN: 0310-7841
DOCUMENT TYPE: Literature Review
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: This review deals with the physiological and morphological effects of altering the auxin/**cytokinin** balance in transgenic **plants** by **expressing** specific genes from pathogenic bacteria. Genes which have been used to alter auxin levels or sensitivity in transgenic **plants** include the iaaM/iaaH genes from Agrobacterium tumefaciens and A. rhizogenes; gene 5 and possibly gene 6b from A.

tumefaciens; the rol B and possibly the rol A gene from A. rhizogenes and the iaaL gene from Pseudomonas syringae subsp. savastanoi (P. savastanoi). Genes which have been used to alter **cytokinin** levels in transgenic **plants** include the **ipt** gene from A. tumefaciens and the rol C gene from A. rhizogenes. A variety of biochemical mechanisms have been identified which result in alterations to phytohormone levels following **expression** of these genes in transgenic **plants**. Many of the effects on **plant** development are consistent with observations made following exogenous auxin and/or **cytokinin** application to **plant** tissues, and the availability of these genes offers a new approach to the study of **plant** physiology using transformation methodology.

1993

12/3,AB/57 (Item 42 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

08936028 BIOSIS NO.: 199396087529
Expression of a **cytokinin** synthesis gene from Agrobacterium tumefaciens T-DNA in basket willow (Salix viminalis).
AUTHOR: Vahala T(a); Eriksson T; Tillberg E; Nicander B
AUTHOR ADDRESS: (a)Dep. Molecular Genetics, Swedish Univ. Agricultural Sciences, Box 7003, S-75006 Uppsala**Sweden
JOURNAL: Physiologia Plantarum 88 (3):p439-445 **1993**
ISSN: 0031-9317
DOCUMENT TYPE: Article
RECORD TYPE: Abstract
LANGUAGE: English

ABSTRACT: Willow cells transformed with an **ipt** gene from Agrobacterium tumefaciens grow in tissue culture as undifferentiated callus without shoot induction. We show that the transformed calluses contained high levels of the **cytokinins** 9-beta-D-ribofuranosyl zeatin and its monophosphate, demonstrating the presence of a functional **isopentenyl transferase** enzyme. The **ipt** gene was transcribed at different levels in different transformed callus fines. The absence of shoot differentiation is apparently not due to a lack of zeatin-type **cytokinins** in the transformed callus.

1993

12/3,AB/58 (Item 43 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

08514826 BIOSIS NO.: 199344064826
Cloning and **expression** of the **IPT** gene.
AUTHOR: Barbour Sandra L; Schaff D A; Frett J J
AUTHOR ADDRESS: Dep. Plant Soil Sci., Univ. Delaware, Newark, DE 19717** USA
JOURNAL: Hortscience 27 (11):p1160 **1992**
CONFERENCE/MEETING: Annual Meeting of the ASHS (American Society for Horticultural Science) Northeast Region Amherst, Massachusetts, USA January 9-11, 1992
ISSN: 0018-5345
RECORD TYPE: Citation
LANGUAGE: English
1992

12/3,AB/59 (Item 44 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

08140288 BIOSIS NO.: 000093127436
FASCIATION INDUCTION BY THE PHYTOPATHOGEN RHODOCOCCUS-FASCIANS DEPENDS UPON UPON A LINEAR PLASMID ENCODING A **CYTOKININ** SYNTHASE GENE
AUTHOR: CRESPI M; MESSENS E; CAPLAN A B; VAN MONTAGU M; DESOMER J
AUTHOR ADDRESS: LABORATORIUM VOOR GENETICA, UNIVERSITEIT GENT, B-9000 GENT, BELGIUM.
JOURNAL: EMBO (EUR MOL BIOL ORGAN) J 11 (3). 1992. 795-804. **1992**
FULL JOURNAL NAME: EMBO (European Molecular Biology Organization) Journal
CODEN: EMJOD
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Rhodococcus fascians is a nocardiform bacteria that induces leafy galls (fasciation) of dicotyledonous and several monocotyledonous **plants**. The wild-type strain D188 contained a conjugative, 200 kb linear extrachromosomal element, pFiD188. Linear plasmid-cured strains were avirulent and reintroduction of this linear element restored virulence. Pulsed field electrophoresis indicated that the chromosome might also be a linear molecule of 4 megabases. Three loci involved in phytopathogenicity have been identified by insertion mutagenesis of this Fi plasmid. Inactivation of the fas locus resulted in avirulent strains, whereas insertions in the two other loci affected the degree of virulence, yielding attenuated (att) and hypervirulent (hyp) bacteria. One of the genes within the fas locus encoded an isopentenyltransferase (**IPT**) with low homology to analogous proteins from Gram-negative phytopathogenic bacteria. **IPT** activity was detected after **expression** of this protein in Escherichia coli cells. In R. fascians, **ipt expression** could only be detected in bacteria induced with extracts from fasciated tissue. R. fascians strains without the linear plasmid but containing this fas locus alone could not provoke any phenotype on **plants**, indicating additional genes from the linear plasmid were also essential for virulence. These studies, the first genetic analysis of the interaction of a Gram-positive bacterium with **plants**, suggest that a novel mechanism for **plant** tumour induction has evolved in R. fascians independently from the other branches of the eubacteria.

1992

12/3,AB/60 (Item 45 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

07949577 BIOSIS NO.: 000093028675
REGENERATION OF **PLANTS** FROM PEACH EMBRYO CELLS INFECTED WITH A SHOOTY MUTANT STRAIN OF AGROBACTERIUM
AUTHOR: SMIGOCKI A C; HAMMERSCHLAG F A
AUTHOR ADDRESS: U.S. DEP. AGRIC., AGRIC. RES. SERV., PLANT MOL. BIOL. LAB., BELTSVILLE, MD. 20705, USA.
JOURNAL: J AM SOC HORTIC SCI 116 (6). 1991. 1092-1097. **1991**
FULL JOURNAL NAME: Journal of the American Society for Horticultural Science
CODEN: JOSHB
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Immature 'Redhaven' peach [Prunus persica (L.) Batsch] embryos were infected with a shooty mutant strain of Agrobacterium tumefaciens, tms328::Tn5, which carries an octopine-type Ti plasmid with a functional

cytokinin gene and a mutated auxin gene. Shoots were regenerated from embryo-derived callus that was initiated on MS medium lacking phytohormones. Shoots exhibit increased frequency of branching and were more difficult to root than the noninfected. Transcripts of the tms328::Tn5-**cytokinin** gene were detected using northern analyses of total **plant** RNA. Polymerase chain reaction of genomic DNA and cDNA resulted in amplification of DNA fragments specific for the **cytokinin** gene, as determined by restriction enzyme and Southern analyses. The concentrations of the **cytokinins** zeatin and zeatin riboside in the leaves of regenerated **plants** were on the average 51-fold higher than in leaves taken from nontransformed **plants**. None of the shoots or callus tissues were positive for octopine. The **expression** of the T-DNA encoded **cytokinin** gene promotes growth of peach cells in the absence of phytohormones, thus serving as a marker for transformation. In addition, this gene appears to promote morphogenesis without an auxin inductive step.

1991

12/3,AB/61 (Item 46 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

07400418 BIOSIS NO.: 000091016028
RESTORATION OF SHOOTY MORPHOLOGY OF A NONTUMOROUS MUTANT OF NICOTIANA-GLAUCA X NICOTIANA-LANGSDORFFII BY **CYTOKININ** AND THE ISOPENTENYLTRANSFERASE GENE
AUTHOR: FENG X-H; DUBE S K; BOTTINO P J; KUNG S-D
AUTHOR ADDRESS: CENT. AGRIC. BIOTECHNOL., UNIV. MD., COLLEGE PARK, MD. 20742.
JOURNAL: PLANT MOL BIOL 15 (3). 1990. 407-420. **1990**
FULL JOURNAL NAME: Plant Molecular Biology
CODEN: PMBID
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: The shooty morphology of a nontumorous amphidiploid mutant of Nicotiana glauca Grah. .times. N. langsdorffii Weinm. was restored by **cytokinins**, whether exogenously applied or endogenously produced by transformation of the mutant with a transfer DNA (T-DNA) **cytokinin** -biosynthesis gene (isopentenyltransferase; **ipt**). Auxins alone did not confer this effect. Similar transformation was not achieved for the parental species. In the case of transformation with the **ipt** gene, selection of the transformed tissues was based on its hormone-independent growth in the presence of the antibiotic kanamycin. Transformed tissues exhibited a shooty morphology, indistinguishable from the of wildtype genetic tumors N. glauca .times. N. langsdorffii. This altered phenotype was caused by the presence and constitutive **expression** of the **ipt** gene. the insertion and **expression** of this gene in transformed tissues was confirmed by using the polymerase chain reaction (PCR) technique as well as conventional molecular hybridization analysis. **Expression** of the **ipt** gene led to an elevated level of **cytokinin** in the transformed mutant tissues. This evidence supports the notion that genetic tumors are caused, at least in part, by elevated levels of **cytokinin** interspecific hybrids.

1990

12/3,AB/62 (Item 47 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

07282799 BIOSIS NO.: 000090062686
AGROBACTERIUM-MEDIATED TRANSFORMATION OF THE CULTIVATED STRAWBERRY FRAGARIA-ANANASSA DUCH. USING DISARMED BINARY VECTORS
AUTHOR: JAMES D J; PASSEY A J; BARBARA D J
AUTHOR ADDRESS: INST. HORTICULTURAL RESEARCH, EAST MALLING, MAIDSTONE, KENT, ME19 6BJ, UK.
JOURNAL: PLANT SCI (LIMERICK) 69 (1). 1990. 79-94. **1990**
CODEN: PLSCE
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Two disarmed Ti-binary vectors in Agrobacterium tumefaciens have been used to produce viable transgenic strawberry **plants**. Fertile strawberry **plants** with a normal phenotype were regenerated after transformation with pBIN6, which carries genes for nopaline synthase (nos) and neomycin phosphotransferase (nptII) (conferring kanamycin resistance). The transfer and **expression** of the two genes was confirmed by Southern blot analysis, the detection of nopaline synthase (NOS) activity in vegetative and reproductive tissues and rooting in vitro in the presence of kanamycin. The nos gene continued to be **expressed** in glasshouse-grown **plants** many months after removal from in vitro growth conditions. After selfing the RO **plants** nos segregated in the R1 progeny according to a 3:1 Mendelian ratio. In in vitro germinated seedlings there was complete correlation between the presence of nopaline synthase activity and the ability of leaf segments to produce callus on a medium containing kanamycin. Transgenic clones that exhibited an abnormal phenotype associated with **cytokinin** overproduction were produced when **plants** were transformed with pSS1, a derivative of pBIN19 carrying both the nptII gene and the **ipt** gene (encoding the enzyme isopentenyltransferase). Shoots of these clones grew on hormone-free medium, could not be induced to root and their growth was unaffected by the presence of 50 .mu.g/ml kanamycin in hormone-free media.

1990

12/3,AB/63 (Item 48 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06925388 BIOSIS NO.: 000089058780
TRANSFER OF THE AGROBACTERIAL **CYTOKININ** BIOSYNTHESIS GENE INTO TOBACCO **PLANTS**
AUTHOR: YUSIBOV V M; POGOSYAN G P; ANDRIANOV V M; PIRUZYAN E S
AUTHOR ADDRESS: INST. MOL. GENET., ACAD. SCI. USSR, MOSCOW, USSR.
JOURNAL: MOL GENET MIKROBIOL VIRUSOL 0 (7). 1989. 11-13. **1989**
FULL JOURNAL NAME: Molekulyarnaya Genetika Mikrobiologiya i Virusologiya
CODEN: MGMVD
RECORD TYPE: Abstract
LANGUAGE: RUSSIAN

ABSTRACT: The gene transfer into **plants** using the genetic engineering methods gives us the possibility to obtain transgeneric **plants** having acquired the new traits. Some bacterial genes can be used for this purpose. Obtaining of a transgeneric **plant** harbouring the **cytokinin** synthesis gene **ipt** (gene 4) from the T-DNA of Agrobacterium tumefaciens Ti-plasmid seems to be useful. The **expression** of tumor agrobacterial **ipt** gene in transformed **plant** cells interferes with the normal growth and regulation of the whole **plant**. The successful transfer of the cloned **ipt** gene from the recombinant plasmid pGV0319 into the tobacco **plant** using Agrobacterium vectors and succeeding regeneration of phenotypically normal transgenic **plants** are reported in the present paper.

1989

12/3,AB/64 (Item 49 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06644386 BIOSIS NO.: 000087086563
ENDOGENOUS **CYTOKININ**-INDUCED PR-PROTEIN SYNTHESIS IN NICOTIANA-TABACUM **PLANTS**
AUTHOR: ZAKHAR'EV V M; TASHPULATOV A SH; NURKIYANOVA K M; TAL'YANSKII M E; KAPLAN I B; ATABEKOV I G; SKRYABIN K G
AUTHOR ADDRESS: INST. MOL. BIOL., ACAD. SCI. USSR, MOSCOW, USSR.
JOURNAL: DOKL AKAD NAUK SSSR 301 (3). 1988. 743-745. **1988**
FULL JOURNAL NAME: Doklady Akademii Nauk Sssr
CODEN: DANKA
RECORD TYPE: Abstract
LANGUAGE: RUSSIAN

ABSTRACT: Transgenic N. tabacum **plants expressing isopentenyl transferase** were created. A diagram describing the construction of the pAShT24 plasmid was presented. It was shown that intensive **cytokinin** synthesis in transgenic **plants** stimulates the production of PR-proteins and, possibly, increases the resistance of these **plants** to tobacco mosaic virus. The results of the study make it possible to establish a new approach for obtaining transgenic **plants** resistant to virus infections.
1988

12/3,AB/65 (Item 50 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06163519 BIOSIS NO.: 000085126671
HORMONAL REGULATION OF ZEATIN-RIBOSIDE ACCUMULATION BY CULTURED TOBACCO CELLS
AUTHOR: HANSEN C E; MEINS F JR; AEBI R
AUTHOR ADDRESS: FRIEDRICH MIESCHER-INST., P.O. BOX 2543, CH-4002 BASEL, SWITZERLAND.
JOURNAL: PLANTA (BERL) 172 (4). 1987. 520-525. **1987**
FULL JOURNAL NAME: PLANTA (Berlin)
CODEN: PLANA
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Auxin (11 .mu.M .alpha.-naphthaleneacetic acid) and **cytokinin** (1.4 .mu.M kinetin) regulate **cytokinin** accumulation by **cytokinin**-requiring (C-) and **cytokinin**-autotrophic (C+) lines of Havana 425 tobacco (Nicotiana tabacum L.) tissues. No trans-zeatin riboside (ZR) (< 0.5 pmol .cntdot. g-1 fresh weight) was detected in six C- and nine C+ lines grown for 14 d on auxin + **cytokinin** and auxin medium, respectively. C+ lines, but not C- lines accumulated ZR (1.9-51. p mol .cntdot. g-1 fresh weight) when incubated on hormone-free medium but both lines accumulated ZR when incubated on kinetin medium. Therefore, it appears that kinetin treatment can induce ZR accumulation and that this accumulation is blocked by auxin treatment. Similar effects were obtained with some lines of cells autotrophic for both auxin and **cytokinin**. Tobacco **plants** carrying the dominant Habituated leaf-1 allele (Hl-1) differ from wild-type **plants** in that leaf-derived tissues in culture exhibit a C+ phenotype. No differences in ZR content were found in C+ leaf tissues from Hl-1/Hl-1 **plants** and C+ tissues that arise epigenetically in

wild-type **plants**. This indicates that the H-1 allele does not act to induce overproduction of ZR. The Hl-1 allele is known to have oncogenic functions similar to the **isopentenyl transferase** (**ipt**) locus of the Ti plasmid. Although Hl-1/Hl-1 cells transformed with Ti plasmids defective at the **ipt** locus are tumorigenic and hormone-autotrophic in culture, they contain low levels of ZR typical of non-transformed Hl-1 Hl-1 cells. Therefore, the high levels of ZR characteristic of cells transformed with wild-type Ti plasmids are not necessary for **expression** of the tumor phenotype.

1987

12/3,AB/66 (Item 51 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06074284 BIOSIS NO.: 000085037433
TUMOR FORMATION AND MORPHOGENESIS ON DIFFERENT NICOTIANA-SP AND HYBRIDS INDUCED BY AGROBACTERIUM-TUMEFACIENS T DNA MUTANTS
AUTHOR: NACMIAS B; UGOLINI S; RICCI M D; PELLEGRINI M G; BOGANI P; BETTINI P; INZE D; BUIATTI M
AUTHOR ADDRESS: DEP. ANIMAL BIOL. GENETICS, UNIV. FLORENCE, ITALY.
JOURNAL: DEV GENET 8 (2). 1987. 61-72. **1987**
FULL JOURNAL NAME: Developmental Genetics
CODEN: DGNTD
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: A series of experiments are presented that have been performed to observe the interactions between Agrobacterium tumefaciens strains mutated in the T-DNA genes involved in indoleacetic acid and **cytokinin** biosynthesis and several Nicotiana species and hybrids. Infections were induced on leaf cuttings of Nicotiana debneyi, N. knightiana, N. clevelandii, N. bigelovii var. bigelovii, N. bigelovii var quadrivalvis, N. glauca, N. langsdorffi, the amphidiploid tumorous hybrid N. glauca .times. N. langsdorffi, and a nontumorous mutant of it. The effect of deletions of the Ti plasmid varied according to **plant** genotype. Insertion mutants in iaaM and iaaH suppressed tumor formation in N. langsdorffii, reduced it in N. bigelovii var quadrivalvis, had no effect in N. glauca and the two amphidiploid hybrids, and promoted tumorigenesis when compared to the wild-type Agrobacterium strain B6S3 in N. bigelovii var bigelovii, N. debneyi, and N. knightiana. The same mutations induced shoot formation in N. glauca, increased it in N. debneyi, and suppressed root formation in N. knightiana. On the other hand, an insertion mutation of the **isopentenyl transferase** gene (**ipt**-) had no effect in N. bigelovii var quadrivalvis, N. debneyi, the tumorous hybrid, suppressed tumor formation in N. langsdorffii, and **inhibited** it in N. glauca, the nontumorous hybrid, N. bigelovii var bigelovii, and N. knightiana. Insertion in **ipt** suppressed shoot formation in the nontumourous hybrid and **inhibited** it in the nontumorous amphidiploid and N. debneyi, while promoting root formation in N. glauca and N. debneyi. The suggestion of the existence of specific hormone equilibria necessary for the shift to each morphogenetic pattern was supported by experiments with exogenous hormone treatments of three genotypes (N. glauca, N. langsdorffii, and the nontumourous N. glauca .times. N. langsdorffii).

1987

12/3,AB/67 (Item 52 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

06063253 BIOSIS NO.: 000085026402
TWO AGROBACTERIUM-TUMEFACIENS GENES FOR **CYTOKININ** BIOSYNTHESIS TI PLASMID-CODED ISOPENTENYLTRANSFERASES ADAPTED FOR FUNCTION IN PROKARYOTIC OR EUKARYOTIC CELLS
AUTHOR: HEINEMEYER W; BUCHMANN I; TONGE D W; WINDASS J D; ALT-MOERBE J; WEILER E W; BOTZ T; SCHROEDER J
AUTHOR ADDRESS: INST. BIOL. II, UNIV. FREIBURG, SCHAENZLESTR. 1, D-7800 FREIBURG, FRG.
JOURNAL: MOL GEN GENET 210 (1). 1987. 156-164. **1987**
FULL JOURNAL NAME: Molecular & General Genetics
CODEN: MGGEA
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Tzs and **ipt** are two Ti plsmid genes coding for proteins with isopentenyltransferase (**IPT**) activity in vitro. We cloned both genes for protein **expression** in Escherichia coli and in Agrobacterium tumefaciens, and we investigated differences between the two genes by analysing the properties of the proteins in vitro and in vivo. In vitro, extracts with tzs or **ipt**-coded proteins had high **IPT** activity, and the enzymes were identical in most properties. The most important difference was detected in vivo: the tzs-encoded protein was very active in **cytokinin** production, while the **ipt** protein required overexpression in order to obtain measurable activity in bacteria. In both cases, trans-zeatin was the major product of the gene activity. Formation of this **cytokinin** requires a hydroxylase function in addition to the **IPT** reaction. No such activity could be ascribed to tzs or **ipt**-encoded proteins in vitro or in vivo, but **cytokinin** hydroxylase activity was detected in cells and extracts of E. coli regardless of the presence or absence of the **cytokinin** genes. Based on these results it is proposed that both genes code for a single enzyme activity (isopentenyltransferase), that the genes and the proteins are adapted for function either in bacteria (tzs) or in transformed **plant** cells (**ipt**), and that in both prokaryotic and eukaryotic cells hydroxylation to trans-zeatin is a function contributed by host enzymes.

1987

12/3,AB/68 (Item 53 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

05764106 BIOSIS NO.: 000084112513
INITIATION OF AUXIN AUTONOMY IN NICOTIANA-GLUTINOSA CELLS BY THE **CYTOKININ**-BIOSYNTHESIS GENE FROM AGROBACTERIUM-TUMEFACIENS
AUTHOR: BINNS A N; LABRIOLA J; BLACK R C
AUTHOR ADDRESS: DEP. BIOL., UNIV. PENNSYLVANIA, PHILADELPHIA, PA. 19104-6018.
JOURNAL: PLANTA (BERL) 171 (4). 1987. 539-548. **1987**
FULL JOURNAL NAME: PLANTA (Berlin)
CODEN: PLANA
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Agrobacteria carrying mutations at the auxin-biosynthesizing loci (iaaH and iaaM of the Ti plasmid) induce shoot-forming tumors on many **plant** species. In some cases, e.g. Nicotiana glutinosa L., tumors induced by such mutant strains exhibit an unorganized and fully autonomous phenotype. These characteristics are stable in culture at both the tissue and cellular level. We demonstrate that the **cytokinin** -biosynthesis gene (**ipt**) of the Ti plasmid is responsible for the

induction of both auxin and **cytokinin** autonomy in N. glutinosa. Cloned cell lines carrying an **ipt** gene but lacking iaaH and iaaM are capable of accumulating indole-3-acetic acid. Interestingly, non-transformed N. glutinosa tissues exhibit an auxin-requiring phenotype when they are grown on medium supplemented with an exogenous supply of **cytokinin**. These results strongly indicate that exogenously supplied **cytokinin** does not mimic all the effects of the **expression** of the **ipt** gene in causing the auxin-autonomous growth of N. glutinosa cells.

1987

12/3,AB/69 (Item 54 from file: 5)
DIALOG(R)File 5:Biosis Previews(R)

04745980 BIOSIS NO.: 000080049107
TUMOR GENES IN **PLANTS** T DNA ENCODED **CYTOKININ** BIOSYNTHESIS
AUTHOR: BUCHMANN I; MARNER F-J; SCHROEDER G; WAFFENSCHMIDT S; SCHROEDER J
AUTHOR ADDRESS: INST. FUER BIOL. II, UNIV. FREIBURG, SCHAENZLESTR. 1, D-7800 FREIBURG, FRG.
JOURNAL: EMBO (EUR MOL BIOL ORGAN) J 4 (4). 1985. 853-860. **1985**
FULL JOURNAL NAME: EMBO (European Molecular Biology Organization) Journal
CODEN: EMJOD
RECORD TYPE: Abstract
LANGUAGE: ENGLISH

ABSTRACT: Whether gene 4 from the T-region of the Agrobacterium tumefaciens Ti plasmid codes for an enzyme of hormone biosynthesis was investigated. In a 1st set of experiments, gene 4 from octopine plasmid pTiAch5 and nopaline plasmid pTiC58 was **expressed** in Escherichia coli, and the gene products were identified by reaction with antiserum raised against a decapeptide derived from the DNA sequence of the gene. Extracts from cells **expressing** the gene contained high **isopentenyl transferase** activity catalyzing the formation of N6-(.DELTA.2-**isopentenyl**)adenosine from 5'-AMP and .DELTA.2-isopentenylpyrophosphate. The **cytokinin** was identified by sequential high performance liquid chromatography and mass spectrometry. In a 2nd set of experiments it was shown that crown gall cells contained **isopentenyl transferase** activity and a protein of MW 27,000, which was identified as the product of gene 4 by reaction with the antiserum. **Isopentenyl transferase** activity was specifically **inhibited** by the antiserum. No comparable enzyme activity or immunoreactive protein was detected in **cytokinin**-autotrophic, T-DNA free tobacco cells. The results establish that gene 4 from the T-region of octopine and nopaline Ti plasmids codes for an enzyme of **cytokinin** biosynthesis.

1985

12/3,AB/70 (Item 1 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

07302954 Genuine Article#: 147XB Number of References: 11
Title: Rice transformation with a senescence-**inhibition** chimeric gene (ABSTRACT AVAILABLE)
Author(s): Fu YC; Ding YY; Liu XF; Sun CQ; Cao SY; Wang DJ; He SJ; Wang XK; Li LC; Tian WZ (REPRINT)
Corporate Source: CHINESE ACAD SCI,GENET INST/BEIJING 100101//PEOPLES R CHINA/ (REPRINT); CHINESE ACAD SCI,GENET INST/BEIJING 100101//PEOPLES R CHINA/; CHINA AGR UNIV,/BEIJING 100094//PEOPLES R CHINA/

Journal: CHINESE SCIENCE BULLETIN, **1998**, V43, N21 (NOV), P1810-1815
ISSN: 1001-6538 Publication date: 19981100
Publisher: SCIENCE CHINA PRESS, 16 DONGHUANGCHENGGEN NORTH ST, BEIJING 100717, PEOPLES R CHINA
Language: English Document Type: ARTICLE
Abstract: A senescence-**inhibition** chimeric gene containing the specific promoter of SAG(12) and **IPT** gene was transferred into rice with the biolistic method. Results of PCR, Dot blotting and Southern blotting indicated that the chimeric gene had been integrated into rice genome. Analyses of GUS activity and **cytokinin** content in transgenic **plants** of rice and the observation of T-1 generation **plant** at grain formation stage indicated that the foreign gene was **expressed**.

12/3,AB/71 (Item 2 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

07048099 Genuine Article#: 118EM Number of References: 48
Title: **Expression** of the yeast mevalonate kinase gene in trangenic tobacco (ABSTRACT AVAILABLE)
Author(s): Champenoy S; Tourte M (REPRINT)
Corporate Source: IBMIG,UPRES 1221, LAB BIOL CELLULAIRE VEGETALE, 40 AVE RECTEUR PINEAU/F-86022 POITIERS//FRANCE/ (REPRINT); IBMIG,UPRES 1221, LAB BIOL CELLULAIRE VEGETALE/F-86022 POITIERS//FRANCE/
Journal: MOLECULAR BREEDING, **1998**, V4, N4, P291-300
ISSN: 1380-3743 Publication date: 19980000
Publisher: KLUWER ACADEMIC PUBL, SPUIBOULEVARD 50, PO BOX 17, 3300 AA DORDRECHT, NETHERLANDS
Language: English Document Type: ARTICLE
Abstract: The coding region of the yeast mevalonate kinase gene (ERG12), under the control of the cauliflower mosaic virus (CaMV) 35S promoter, has been inserted in tobacco (Nicotiana tabacum cv. Paraguay Bell) using an Agrobacterium tumefaciens binary vector system. Integration and **expression** of the ERG12 chimaeric gene was demonstrated in several independent transformants in which specific mevalonate kinase (MK) activity in young **plantlets** was increased by about 60% on average. The **expression** of this MK gene was accompanied by phenotypical modifications, such as acceleration of regenerating processes, lateral bud growth, and peculiar flowering behaviour. A higher chlorophyll content all along the **plant** development, paralleled by an unusual starch accumulation in the leaves of young **plantlets** and, later, in roots of full-grown **plants**, was also detected. Overexpression of the MK gene led also to a stronger **inhibition** of **cytokinin**-induced **plant** growth by methyl jasmonate in transgenic **plants**. All these events may be interpreted as a possible modification of the hormonal balance in transgenic tobaccos.

12/3,AB/72 (Item 3 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06866764 Genuine Article#: ZX908 Number of References: 59
Title: Two genes with similarity to bacterial response regulators are rapidly and specifically induced by **cytokinin** in Arabidopsis (ABSTRACT AVAILABLE)
Author(s): Brandstatter I; Kieber JJ (REPRINT)
Corporate Source: UNIV ILLINOIS,DEPT BIOL SCI, MOL BIOL LAB/CHICAGO//IL/60607 (REPRINT); UNIV ILLINOIS,DEPT BIOL SCI, MOL BIOL LAB/CHICAGO//IL/60607
Journal: PLANT CELL, **1998**, V10, N6 (JUN), P1009-1019

ISSN: 1040-4651 Publication date: 19980600
Publisher: AMER SOC PLANT PHYSIOLOGISTS, 15501 MONONA DRIVE, ROCKVILLE, MD 20855
Language: English Document Type: ARTICLE
Abstract: **Cytokinins** are central regulators of **plant** growth and development, but little is known about their mode of action. By using differential display, we identified a gene, IBC6 (for induced by **cytokinin**), from etiolated Arabidopsis seedlings, that is induced rapidly by **cytokinin**. The steady state level of IBC6 mRNA was elevated within 10 min by the exogenous application of **cytokinin**, and this induction did not require de novo protein synthesis. IBC6 was not induced by other **plant** hormones or by light. A second Arabidopsis gene with a sequence highly similar to IBC6 was identified. This IBC7 gene also was induced by **cytokinin**, although with somewhat slower kinetics and to a lesser extent. The pattern of **expression** of the two genes was similar, with higher **expression** in leaves, rachises, and flowers and lower transcript levels in roots and siliques. Sequence analysis revealed that IBC6 and IBC7 are similar to the receiver domain of bacterial two-component response regulators. This homology, coupled with previously published work on the CKI1 histidine kinase homolog, suggests that these proteins may play a role in early **cytokinin** signaling.

12/3,AB/73 (Item 4 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06398998 Genuine Article#: YP814 Number of References: 248
Title: The molecular basis of **cytokinin** action (ABSTRACT AVAILABLE)
Author(s): Hare PD (REPRINT) ; vanStaden J
Corporate Source: UNIV NATAL,DEPT BOT, RES UNIT PLANT GROWTH & DEV, PRIVATE BAG X01/ZA-3209 SCOTTSVILLE//SOUTH AFRICA/ (REPRINT)
Journal: PLANT GROWTH REGULATION, **1997**, V23, N1-2 (OCT), P41-78
ISSN: 0167-6903 Publication date: 19971000
Publisher: KLUWER ACADEMIC PUBL, SPUIBOULEVARD 50, PO BOX 17, 3300 AA DORDRECHT, NETHERLANDS
Language: English Document Type: REVIEW
Abstract: Current understanding of **cytokinin** (CK) physiology at the cellular level results largely from the manipulation of endogenous CK levels by either application of exogenous CKs or the **expression** of CK biosynthetic transgenes, as well as the characterisation of single gene mutants. **Cytokinins modulate** changes in **plant** gene **expression**, which are in turn assumed to effect physiological and morphological changes with which CK action is associated. Presently, a major focus of investigation is elucidation of the biochemical events leading from the perception of CK to the manifestation of a response. Analysis of the **expression** patterns of CK-regulated genes and identification of their products provides one means of investigating CK action at the molecular level. Biochemical approaches have led to the identification of several soluble CK-binding proteins, although their functional roles in CK signalling largely remain uncertain. Conclusive identification of a bona fide CK receptor has yet to be achieved, although several potential candidates have been suggested. Pharmacological and molecular genetic strategies have implicated the involvement of signalling mechanisms likely to be involved in CK action. The apparent involvement of fluctuations in the concentration of intracellular Ca2+, changes in protein phosphorylation as well as DNA and/or protein methylation provide information concerning the types of proteins likely to be involved in the process. Dissection of CK signal transduction chains and elucidation of their interaction with other pathways that regulate **plant** growth and development is likely to be essential in understanding the mode of action of this poorly understood class of **plant** growth regulator.

However, integration of this knowledge with an improved understanding of the mechanisms whereby overall hormone homeostasis is regulated at the metabolic level will be necessary for comprehensive appreciation of the influence of CKs on **plant** morphology and physiology.

12/3,AB/74 (Item 5 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06284505 Genuine Article#: YF800 Number of References: 30
Title: The rms1 mutant of pea has elevated indole-3-acetic acid levels and reduced root-sap zeatin riboside content but increased branching controlled by graft-transmissible signal(s) (ABSTRACT AVAILABLE)
Author(s): Beveridge CA (REPRINT) ; Symons GM; Murfet IC; Ross JJ; Rameau C
Corporate Source: INRA,GENET & AMELIORAT PLANTES STN, ROUTE ST CYR/F-78026 VERSAILLES//FRANCE/ (REPRINT); UNIV TASMANIA,DEPT PLANT SCI/HOBART/TAS 7001/AUSTRALIA/; UNIV QUEENSLAND,DEPT BOT/BRISBANE/QLD 4072/AUSTRALIA/
Journal: PLANT PHYSIOLOGY, **1997**, V115, N3 (NOV), P1251-1258
ISSN: 0032-0889 Publication date: 19971100
Publisher: AMER SOC PLANT PHYSIOLOGISTS, 15501 MONONA DRIVE, ROCKVILLE, MD 20855
Language: English Document Type: ARTICLE
Abstract: Rms1 is one of the series of five ramosus loci in pea (Pisum sativum L.) in which recessive mutant alleles confer increased branching at basal and aerial vegetative nodes. Shoots of the nonallelic rms1 and rms2 mutants are phenotypically similar in most respects. However, we found an up to 40-fold difference in root-sap zeatin riboside ([9R]Z) concentration between rms1 and rms2 **plants**. Compared with wild-type (WT) **plants**, the concentration of [9R]Z in rms1 root sap was very low and the concentration in rms2 root sap was slightly elevated. To our knowledge, the rms1 mutant is therefore the second ramosus mutant (rms4 being the first) to be characterized with low root-sap [9R]Z content. Like rms2, the apical bud and upper nodes of rms1 **plants** contain elevated indole-3-acetic acid levels compared with WT shoots. Therefore, the rms1 mutant demonstrates that high shoot auxin levels and low root-sap **cytokinin** levels are not necessarily correlated with increased apical dominance in pea. A graft-transmissible basis of action has been demonstrated for both mutants from reciprocal grafts between mutant and WT **plants**. Branching was also largely **inhibited** in rms1 shoots when grafted to rms2 rootstocks, but was not **inhibited** in rms2 shoots grafted to rms1 rootstocks. These grafting results are discussed, along with the conclusion that hormone-like signals other than auxin and **cytokinin** are also involved.

12/3,AB/75 (Item 6 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06177862 Genuine Article#: YA111 Number of References: 35
Title: Increased content of endogenous **cytokinins** does riot delay degradation of photosynthetic apparatus in tobacco (ABSTRACT AVAILABLE)
Author(s): Synkova H (REPRINT) ; VanLoven K; Valcke R
Corporate Source: ACAD SCI CZECH REPUBL,INST EXPT BOT, KARLOVCE 1A/CZ-16000 PRAGUE 6//CZECH REPUBLIC/ (REPRINT); LIMBURGS UNIV CTR,DEPT SBG/B-3590 DIEPENBEEK//BELGIUM/
Journal: PHOTOSYNTHETICA, **1997**, V33, N3-4, P595-608
ISSN: 0300-3604 Publication date: 19970000
Publisher: INST EXPERIMENTAL BOTANY, ACAD SCI CZECH REPUBLIC, NA KARLOVCE 1A, PRAGUE 6, CZECH REPUBLIC CS-160 00
Language: English Document Type: ARTICLE

Abstract: The effect of stress (long-term darkening) on the structure and functioning of the photosynthetic apparatus was studied in leaves of non-transformed as well as two types of **ipt**-transformed tobacco (Nicotiana tabacum cv. Petit Havana SR1) **plants**, The **ipt** -gene controlling the biosynthesis of **cytokinins** (CKs) was coupled to the light-inducible Pssu-promoter of Pisum sativum of to the heat-inducible hsp-promoter of Drosophila melanogaster. Pssu-**ipt** transgenic grafts with high contents of endogenous CKs retained their chlorophyll (Chi) content during a 15 d dark treatment while the SR1- and heat-treated Phsp 70-**ipt** seedlings, which did not differ significantly in CKs content, lost up to 60 % of their Chi. The normalised variable fluorescence ratio (F-v/F-m) and oxygen evolution decreased dramatically in the course of continuous dark treatment, indicating a degradation of photosystem. 2 irrespective of the **plant** type. Changes in the polypeptide composition of thylakoid membranes, as analysed by SDS-PAGE, confirmed this degradation process. Light and electron microscopic observations of leaf sections, and of the ultrastructure of plastids showed changes corresponding to a degradation of the photosynthetic apparatus.

12/3,AB/76 (Item 7 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

06031915 Genuine Article#: XQ731 Number of References: 31
Title: Changes of both polypeptide pattern and sensitivity to **cytokinin** following transformation of periwinkle tissues with the **isopentenyl transferase** gene (ABSTRACT AVAILABLE)
Author(s): Carpin S; Garnier F; Andreu F; Chenieux JC; Rideau M (REPRINT) ; Hamdi S
Corporate Source: UNIV TOURS,LAB BIOL VEGETALE & BIOCHIM CELLULAIRE, EA 2106, 31 AVE MONGE/F-37200 TOURS//FRANCE/ (REPRINT); UNIV TOURS,LAB BIOL VEGETALE & BIOCHIM CELLULAIRE, EA 2106/F-37200 TOURS//FRANCE/
Journal: PLANT PHYSIOLOGY AND BIOCHEMISTRY, **1997**, V35, N8 (AUG), P 603-609
ISSN: 0981-9428 Publication date: 19970800
Publisher: GAUTHIER-VILLARS, 120 BLVD SAINT-GERMAIN, 75280 PARIS CEDEX 06, FRANCE
Language: English Document Type: ARTICLE
Abstract: Two-dimensional gel electrophoresis was used to examine differences between the polypeptide patterns of an untransformed periwinkle callus line and a transformed line carrying the **cytokinin** biosynthesis gene **isopentenyl transferase** (**ipt**) under control of a light-inducible promoter. Both lines were cultured for three weeks on an auxin free medium with or without exogenously-added zeatin, in continuous light or in complete darkness. Firstly, it was found that exogenous **cytokinin** treatment increased the amount of at least 24 polypeptides and decreased the amount of three polypeptides in the untransformed line. Secondly, a marked decrease in the number and the amount of the polypeptides was observed in the 2D-gels from the transgenic line. Traces of two **cytokinin** up-regulated polypeptides, the amounts of which have been previously found to be correlated with the accumulation of indole alkaloids in periwinkle cells in vitro were present in this line. Lastly, exogenous **cytokinin** treatment had very little effect on the polypeptide pattern of the transgenic line. These data show that endogenously-produced **cytokinin** does not mimic the effect of exogenously-applied **cytokinin** on the polypeptide accumulation in periwinkle callus cultures, and that the **ipt**-transgenic line has become insensitive to exogenous **cytokinin** treatment.

12/3,AB/77 (Item 8 from file: 34)

DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05899416 Genuine Article#: XF276 Number of References: 57
Title: **Cytokinin**/auxin control of apical dominance in Ipomoea nil (ABSTRACT AVAILABLE)
Author(s): Cline M (REPRINT) ; Wessel T; Iwamura H
Corporate Source: OHIO STATE UNIV,DEPT PLANT BIOL, 1735 NEIL AVE/COLUMBUS//OH/43210 (REPRINT); KYOTO UNIV,FAC AGR, DEPT AGR CHEM/KYOTO 606//JAPAN/
Journal: PLANT AND CELL PHYSIOLOGY, **1997**, V38, N6 (JUN), P659-667
ISSN: 0032-0781 Publication date: 19970600
Publisher: JAPANESE SOC PLANT PHYSIOLOGISTS, SHIMOTACHIURI OGAWA HIGASHI KAMIKYOKU, KYOTO 602, JAPAN
Language: English Document Type: ARTICLE
Abstract: Although the concept of apical dominance control by the ratio of **cytokinin** to auxin is not new, recent experimentation with transgenic **plants** has given this concept renewed attention, In the present study, it has been demonstrated that **cytokinin** treatments can partially reverse the **inhibitory** effect of auxin on lateral bud outgrowth in intact shoots of Ipomoea nil, Although less conclusive, this also appeared to occur in buds of isolated nodes. Auxin **inhibited** lateral bud outgrowth when applied either to the top of the stump of the decapitated shoot or directly to the bud itself, However, the fact that **cytokinin** promotive effects on bud outgrowth are known to occur when **cytokinin** is applied directly to the bud suggests different transport tissues and/or sites of action for the two hormones, **Cytokinin** antagonists were shown in some experiments to have a synergistic effect with benzyladenine on the promotion of bud outgrowth. If the ratio of **cytokinin** to auxin does control apical dominance, then the next critical question is how do these hormones interact in this correlative process? The hypothesis that shoot-derived auxin **inhibits** lateral bud outgrowth indirectly by depleting **cytokinin** content in the shoots via **inhibition** of its production in the roots was not supported in the present study which demonstrated that the repressibility of lateral bud outgrowth by auxin treatments at various positions on the shoot was not correlated with proximity to the roots but rather with proximity to the buds, Results also suggested that auxin in subtending mature leaves as well as that in the shoot apex and adjacent small leaves may contribute to the apical dominance of a shoot.

12/3,AB/78 (Item 9 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05867710 Genuine Article#: XD243 Number of References: 50
Title: Tobacco **plants** carrying a tms locus of Ti-plasmid origin and the Hl-1 allele are tumor prone (ABSTRACT AVAILABLE)
Author(s): Meyer AD; Aebi R; Meins F (REPRINT)
Corporate Source: FRIEDRICH MIESCHER INST,BOX 2543/CH-4002 BASEL//SWITZERLAND/ (REPRINT); FRIEDRICH MIESCHER INST,/CH-4002 BASEL//SWITZERLAND/
Journal: DIFFERENTIATION, **1997**, V61, N4 (MAY), P213-221
ISSN: 0301-4681 Publication date: 19970500
Publisher: SPRINGER VERLAG, 175 FIFTH AVE, NEW YORK, NY 10010
Language: English Document Type: ARTICLE
Abstract: The autonomous growth of **plant** tumor cells is believed to result from their persistent loss of the requirement for growth hormones such as auxin and **cytokinin**. The partially dominant gene Habituated leaf-1 (HI-1) regulates the requirement of cultures tissues of Havana 425 tobacco (Nicotiana tabacum L.) for **cytokinins**. The HI-1 allele can partially restore the tumor phenotype in tobacco cells

transformed with a Agrobacterium tumefaciens Ti plasmid defective in the **isopentenyl transferase** locus, which encodes a key enzyme in **cytokinin** biosynthesis and is required for neoplastic growth. To investigate the oncogenic function of HI-1, we transformed wild-type (hl-1/hl-1) and Hl-1/Hl-1 tobacco **plants** with the tms locus derived from the limited-host-range Ti plasmid pTiAg162. This locus encodes enzymes for biosynthesis of the auxin indole-3-acetic acid. Grafting tests and measurements of the hormone requirement of cultured explants show that wound-induced overgrowths arising in tms transformed Hl-1 **plants** are tumorous. While some wound-induced overgrowths also formed in hl-1/hl-1 transformants, these showed slight hormone-autotrophic growth and weak tumorigenicity in grafting tests, In addition, Hl-1/Hl-1 tms/tms **plants**, but not hl-1/hl-1 tms/tms **plants**, spontaneously developed rooty teratomatous overgrowths, showed flowering abnormalities, and formed calli at the base of the stem in young seedlings. Thus, Hl-1 tms **plants** exhibit a tumor-prone phenotype, and in this regard closely resemble tumor-prone hybrids that arise in certain interspecific crosses of Nicotiana species. Our results show that the interaction of just two genetic elements - the mutant Hl-1 allele of the tobacco host with tms genes of Ti plasmid origin - are sufficient for a tumor-prone phenotype.

12/3,AB/79 (Item 10 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05754079 Genuine Article#: WV255 Number of References: 36
Title: Growth pattern, tuber formation and hormonal balance in in vitro potato **plants** carrying **ipt** gene (ABSTRACT AVAILABLE)
Author(s): Ivana M (REPRINT) ; Lidiya S; Milos O; Oksana Z; Tatyana K; Josef E; Jaroslava O; Svetlana G; Yurii R; Nina A
Corporate Source: ACAD SCI CZECH REPUBL,DE MONTFORT UNIV, NORMAN BORLAUG INST PLANT SCI, INST EXPT BOT, KE DVORU 15/PRAGUE 16600 6//CZECH REPUBLIC/ (REPRINT); RUSSIAN ACAD SCI,INST PLANT PHYSIOL/MOSCOW 127236//RUSSIA/; ACAD SCI CZECH REPUBL,INST PLANT MOL BIOL/CESKE BUDEJOVICE 38000//CZECH REPUBLIC/; INST CROP PROD,/PRAGUE 16106 6//CZECH REPUBLIC/
Journal: PLANT GROWTH REGULATION, **1997**, V21, N1 (JAN), P27-36
ISSN: 0167-6903 Publication date: 19970100
Publisher: KLUWER ACADEMIC PUBL, SPUIBOULEVARD 50, PO BOX 17, 3300 AA DORDRECHT, NETHERLANDS
Language: English Document Type: ARTICLE
Abstract: Nodal cuttings of in vitro grown potato **plants** (Solanum tuberosum, cv. Miranda) were transformed by a vector plasmid carrying **ipt** gene of Agrobacterium tumefaciens, From the initial teratoma stage 5 clones of transgenic **plants** (1, 2, 11, 13 and 15) were obtained, which displayed in varying degree shortening of the internodes, decrease of the leaf size, decrease of apical dominance and poor rooting. In addition, two of the clones (11 and 13) showed increased stolen and tuber formation. In all these clones the endogenous level of free **cytokinins** (CKs) was increased: from 40% in clone 11 to almost 300% in clone 1. Also free indole-3-acetic acid (IAA) level was increased, but to a lower degree; the maximal increase was 160% (clone 13), Applied kinetin or IAA (1 mg.l(-1)) strongly suppressed root and tuber formation in clones 11 and 13, although they did not affect or even stimulated these processes in control **plants**. For control **plants** the minimal medium sucrose concentration necessary for tuber initiation was 6% whereas in clone 1 1 **plants** 2% was sufficient. Different distribution of endogenous CKs and IAA was observed in clone 11 and control **plants**. The highest CK content was found in transgenic **plants** in stems and in controls in leaves. In clone 11 **plants** abscisic acid (ABA) level was significantly increased in comparison to the control throughout the

cultivation period. Ethylene formation was strongly increased the first week after the subcultivation and later on the difference between transgenic and control **plants** rapidly diminished. Reactions of clone 11 **plants** to red (RL) and blue light (BL) were similar to reactions of control **plants**. In RL clone 11 **plants** were tall and thin with stunted leaves; in BL they had a teratoma-like appearance and formed a very high number of tubers. The role of hormones in these changes in growth and tuber formation is discussed.

12/3,AB/80 (Item 11 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05669711 Genuine Article#: WP334 Number of References: 36
Title: Selection of marker-free transgenic **plants** using the **isopentenyl transferase** gene (ABSTRACT AVAILABLE)
Author(s): Ebinuma H (REPRINT) ; Sugita K; Matsunaga E; Yamakado M
Corporate Source: NIPPON PAPER IND CO LTD,CENT RES LAB, KITA KU, 5-21-1 OJI/TOKYO 114//JAPAN/ (REPRINT)
Journal: PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, **1997**, V94, N6 (MAR 18), P2117-2121
ISSN: 0027-8424 Publication date: 19970318
Publisher: NATL ACAD SCIENCES, 2101 CONSTITUTION AVE NW, WASHINGTON, DC 20418
Language: English Document Type: ARTICLE
Abstract: We have developed a new **plant** vector system for repeated transformation (called MAT for multi-auto-transformation) in which a chimeric **ipt** gene, inserted into the transposable element Ac, is used as a selectable marker for transformation, Selectable marker genes conferring antibiotic or herbicide resistance, used to introduce economically valuable genes into crop **plants**, have three major problems: (i) the selective agents have negative effects on proliferation and differentiation of **plant** cells; (ii) there is uncertainty regarding the environmental impact of many selectable marker genes; (iii) it is difficult to perform recurrent transformations using the same selectable marker to pyramid desirable genes, The MAT vector system containing the **ipt** gene and the Ac element is designed to overcome these difficulties, When tobacco leaf segments were transformed and selected, subsequent excision of the modified Ac produced marker-free transgenic tobacco **plants** without sexual crosses or seed production, In addition, the chimeric **ipt** gene could be visually used as a selectable marker for transformation of hybrid aspen (Populus sieboldii x Populus grandidentata). The chimeric **ipt** gene, therefore, is an attractive alternative to the most widely used selectable marker genes. The MAT vector system provides a promising way to shorten breeding time for genetically engineered crops, This method could be particularly valuable for fruit and forest trees, for which long generation times are a more significant barrier to breeding and genetic analysis.

12/3,AB/81 (Item 12 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05591252 Genuine Article#: WJ343 Number of References: 45
Title: Sterols and polyamines in **IPT**-transformed tobacco **plants** (ABSTRACT AVAILABLE)
Author(s): Geuns JMC (REPRINT) ; VanLoenhout HEM; Valcke RLM; VanLoven K; Redig P; Veselov SY; Kudoyarova GR; VanOnckelen HA; Vendrig JC
Corporate Source: KATHOLIEKE UNIV LEUVEN,LAB PLANT PHYSIOL, MERECIERLAAN 92/B-3001 HEVERLEE//BELGIUM/ (REPRINT); LIMBURGS UNIV CTR,DEPT SBG/B-3590 DIEPENBEEK//BELGIUM/; UNIV INSTELLING ANTWERP,LAB PLANT

PHYSIOL/B-2610 WILRIJK//BELGIUM/; RUSSIAN ACAD SCI,INST BIOL, BASHKIR SCI CTR/UFA 450054/BASHKORTOSTAN/RUSSIA/
Journal: PHYTOCHEMISTRY, **1997**, V44, N5 (MAR), P797-804
ISSN: 0031-9422 Publication date: 19970300
Publisher: PERGAMON-ELSEVIER SCIENCE LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD, ENGLAND OX5 1GB
Language: English Document Type: ARTICLE
Abstract: Free sterol and free polyamine contents were determined in the apex and the leaves of control and Pssu-**ipt** transformed tobacco (Nicotiana tabacum L. cv. Petit Havana SR1). The older leaves of **ipt**-transformed **plants** contained a much higher putrescine (put) content than those of control SR1 **plants**, whereas no significant differences for spermidine (spd) or spermine (spm) were found between control and **ipt plants**. Putrescine content corresponded well with endogenous **cytokinin** (free-bases) content and with ornithine- and ornithine-decarboxylose (ODC and ADC) activities. **Plants** transformed with **ipt** were characterized by a higher sterol content in the leaves and by a delay in the increase in the stigmasterol/sitosterol ratio that occurs from the upper to the lower leaves. Copyright (C) 1997 Elsevier Science Ltd.

12/3,AB/82 (Item 13 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

05572934 Genuine Article#: WH449 Number of References: 31
Title: Cultivars of hexaploid wheat of contrasting stature and chlorophyll retention differ in **cytokinin** content and responsiveness (ABSTRACT AVAILABLE)
Author(s): Banowetz GM (REPRINT)
Corporate Source: USDA ARS,3450 SW CAMPUS WAY/CORVALLIS//OR/97331 (REPRINT)
Journal: ANNALS OF BOTANY, **1997**, V79, N2 (FEB), P185-190
ISSN: 0305-7364 Publication date: 19970200
Publisher: ACADEMIC PRESS LTD, 24-28 OVAL RD, LONDON, ENGLAND NW1 7DX
Language: English Document Type: ARTICLE
Abstract: The work reported here compared **cytokinin** content and sensitivity in a selection of hexaploid wheat (Triticum aestivum L.) cultivars using the following measurements: leaf **cytokinins** at three time points during light-growth and at four 24 h intervals after light-grown **plants** were transferred to darkness; sensitivity of root growth to direct applications of isopentenyl adenosine ([9R]iP); and, sensitivity of germination and subsequent root and shoot growth to 18 h imbibition of seeds in benzyladenine (BA).

Accumulation of zeatin riboside-type cultivars was greatest during light-growth in Tibet Dwarf a wheat with an extreme dwarf phenotype, intermediate in Omar standard and dwarf cultivars, and lowest in the standard and dwarf versions of ltana. **Cytokinin** levels were otherwise not directly correlated to **plant** stature in these wheats. There were no cultivar-associated qualitative differences in the types of **cytokinins** detected in this study. During the 16 h light period, the content of zeatin riboside-type **cytokinins** increased up to tenfold and then declined to basal levels during dark growth. Chlorophyll retention during dark-growth was correlated with leaf **cytokinin** content. Data collected at a restricted number of sampling points during dark-growth suggested a cyclic accumulation of [9R]iP-type **cytokinins** and the apparent cycle in Tibet Dwarf was offset by 24 h. Tibet Dwarf showed the greatest root growth **inhibition** after exposure of seedling roots to [9R]iP or imbibition of seeds in BA. Neither of these treatments affected shoot growth in any of the cultivars. (C) 1997 Annals of Botany Company.

12/3,AB/83 (Item 14 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04995885 Genuine Article#: UY013 Number of References: 71
Title: **CYTOKININS** IN **PLANT** SENESCENCE - FROM SPRAY AND PRAY TO CLONE AND PLAY (Abstract Available)
Author(s): GAN SS; AMASINO RM
Corporate Source: UNIV WISCONSIN,DEPT BIOCHEM,420 HENRY MALL/MADISON//WI/53706; UNIV WISCONSIN,DEPT BIOCHEM/MADISON//WI/53706
Journal: BIOESSAYS, **1996**, V18, N7 (JUL), P557-565
ISSN: 0265-9247
Language: ENGLISH Document Type: REVIEW
Abstract: Three approaches have been used to investigate the **inhibitory** role of the **cytokinin** class of phytohormones in **plant** senescence: external application of **cytokinins**, measurement of endogenous **cytokinin** levels before and during senescence, and manipulation of endogenous **cytokinin** production in transgenic **plants**. In transgenic **plant** studies, endogenous **cytokinin** levels are manipulated by **expression** of **IPT**, a gene encoding **isopentenyl transferase**. Transgenic **plants expressing IPT** from a variety of promoters exhibit developmental and morphological alterations and often display retarded leaf senescence. A recently developed autoregulatory senescence-**inhibition** system targets **cytokinin** production quantitatively, spatially and temporally, and results in transgenic **plants** that exhibit significantly delayed senescence without abnormalities. These transgenic studies not only confirm the regulatory role of **cytokinins** in **plant** senescence, but also provide a way to manipulate senescence for potential agricultural applications.

12/3,AB/84 (Item 15 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04597152 Genuine Article#: TW208 Number of References: 46
Title: TRANSFER-RNA IS THE SOURCE OF EXTRACELLULAR ISOPENTENYLADENINE IN A TI-PLASMIDLESS STRAIN OF AGROBACTERIUM-TUMEFACIENS (Abstract Available)
Author(s): GRAY J; GELVIN SB; MEILAN R; MORRIS RO
Corporate Source: UNIV MISSOURI,DEPT AGRON/COLUMBIA//MO/65211; UNIV MISSOURI,DEPT BIOCHEM/COLUMBIA//MO/65211; PURDUE UNIV,DEPT BIOL SCI/W LAFAYETTE//IN/47909
Journal: PLANT PHYSIOLOGY, **1996**, V110, N2 (FEB), P431-438
ISSN: 0032-0889
Language: ENGLISH Document Type: ARTICLE
Abstract: Even in the absence of the classical Ti plasmid-encoded **cytokinin** biosynthetic genes **ipt** and tzs, Agrobacterium tumefaciens strains still release significant amounts of the **cytokinin** isopentenyladenine (iP) into the culture medium (R.W. Kaiss-Chapman and R.O. Morris [1977] Biochem Biophys Res Commun 76: 453-459). A potential source of the iP is isopentenylated transfer RNA (tRNA), which, in turn, is synthesized by the activity of tRNA:isopentenyltransferase encoded by the bacterial miaA gene. To determine whether secreted iP had its origin in isopentenylated tRNA, a miaA(-) deletion/insertion mutant was prepared and reconstructed in Agrobacterium tumefaciens in vivo. The mutant no longer possessed tRNA:isopentenylation activity and no longer released iP into the extracellular medium. Transfer RNA therefore makes a small but significant contribution to the total amount of **cytokinin** normally secreted by Agrobacterium strains. tRNA-mediated synthesis may also account for **cytokinin** production by other **plant** -associated bacteria, such as Rhizobia, that have been reported to

secrete similarly low levels of nonhydroxylated **cytokinins**.

12/3,AB/85 (Item 16 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04549569 Genuine Article#: TR821 Number of References: 10
Title: TISSUE-CULTURE AND TRANSFORMATION OF OENOTHERA-BIENNIS (Abstract Available)
Author(s): PAVINGEROVA D; GALIS I; ONDREJ M
Corporate Source: ACAD SCI CZECH REPUBL,INST PLANT MOLEC BIOL,BRANISOVSKA 31/CR-37005 CESKE BUDEJOVICE//CZECH REPUBLIC/
Journal: BIOLOGIA PLANTARUM, **1996**, V38, N1, P27-32
ISSN: 0006-3134
Language: ENGLISH Document Type: ARTICLE
Abstract: Five cultivars of Oenothera biennis have been tested for callogenesis and organogenesis on different media. The cultivar CV3 has been transformed by Agrobacterium tumefaciens strain which introduces into the **plant** genome kanamycin resistance gene and the T-DNA **ipt** gene which causes increased levels of **cytokinins**. Transformed tissues showed elevated levels of **cytokinins** and grew as teratomas forming clumps of short, branched shoots with small modified leaves. Roots appeared rarely in later subcultivations of some teratomous clones.

12/3,AB/86 (Item 17 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

04482464 Genuine Article#: TG238 Number of References: 27
Title: THE EFFECT OF AN ELEVATED **CYTOKININ** LEVEL USING THE **IPT** GENE AND N-6-BENZYLADENINE ON SINGLE NODE AND INTACT POTATO **PLANT** TUBERIZATION IN-VITRO (Abstract Available)
Author(s): GALIS I; MACAS J; VLASAK J; ONDREJ M; VANONCKELEN HA
Corporate Source: ACAD SCI CZECH REPUBL,INST PLANT MOLEC BIOL,BRANISOVSKA 31/CR-37005 CESKE BUDEJOVICE//CZECH REPUBLIC/; UNIV INSTELLING ANTWERP,DEPT BIOL/B-2610 WILRIJK//BELGIUM/
Journal: JOURNAL OF PLANT GROWTH REGULATION, **1995**, V14, N3 (SUM), P 143-150
ISSN: 0721-7595
Language: ENGLISH Document Type: ARTICLE
Abstract: Two models of potato (Solanum tuberosum L.) tuberization in vitro (intact **plants** and single nodes) were used to study the role of **cytokinins** in this process. We applied hormone in two different ways. The exogenous addition of 10 mg . L(-1) N-6-benzyladenine (BA) into the tuberization medium resulted in advanced tuber formation in intact **plants**, and microtubers appeared 10-20 days earlier than in the experiments in which no **cytokinin** was supplied. Transformation with the Agrobacterium tumefaciens **ipt** gene provided potato clones with endogenously elevated **cytokinin** levels (3-20 times higher zeatin riboside content in different clones). The onset of tuberization in intact **ipt**-transformed **plants** with low transgene **expression** was advanced in comparison with control material, and exogenously applied BA further promoted the tuberization process. On the contrary, tuberization was strongly **inhibited** in **ipt**-transformed nodes, and an external increase of the **cytokinin** level caused complete **inhibition** of explant growth. In untransformed (control) nodes **cytokinin** application resulted in primary and secondary tuber formation, which depended on the BA concentration in cultivation media.

12/3,AB/87 (Item 18 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
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04206806 Genuine Article#: RN158 Number of References: 43
Title: PHENOTYPE MODIFICATION AND ENHANCED TOLERANCE TO INSECT PESTS BY REGULATED **EXPRESSION** OF A **CYTOKININ** BIOSYNTHESIS GENE
Author(s): SMIGOCKI AC
Corporate Source: USDA ARS,PLANT MOLEC BIOL LAB/BELTSVILLE//MD/20705
Journal: HORTSCIENCE, **1995**, V30, N5 (AUG), P967-969
ISSN: 0018-5345
Language: ENGLISH Document Type: ARTICLE

12/3,AB/88 (Item 19 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

04168686 Genuine Article#: RK531 Number of References: 20
Title: EFFECT OF APEX EXCISION AND REPLACEMENT BY 1-NAPHTHYLACETIC ACID ON **CYTOKININ** CONCENTRATION AND APICAL DOMINANCE IN PEA-**PLANTS** (Abstract Available)
Author(s): LI CJ; GUEVARA E; HERRERA J; BANGERTH F
Corporate Source: UNIV HOHENHEIM,INST OBST GEMUSE & WEINBAU 370/D-70593 STUTTGART//GERMANY/; UNIV HOHENHEIM,INST OBST GEMUSE & WEINBAU 370/D-70593 STUTTGART//GERMANY/; UNIV COSTA RICA,FAC AGRON/SAN JOSE//COSTA RICA/
Journal: PHYSIOLOGIA PLANTARUM, **1995**, V94, N3 (JUL), P465-469
ISSN: 0031-9317
Language: ENGLISH Document Type: ARTICLE
Abstract: As known from literature lateral buds from pea (Pisum sativum) **plants** are released from apical dominance when repeatedly treated with exogenous **cytokinins**. Little is known, however, about the endogenous role of **cytokinins** in this process and whether they interact with basipolar transported IAA, generally regarded as the main signal controlling apical dominance. This paper presents evidence that such an interaction exists.

The excision of the apex of pea **plants** resulted in the release of **inhibited** lateral buds from apical dominance (AD). This could be entirely prevented by applying 1-naphthylacetic acid (NAA) to the cut end of the shoot. Removal of the apex also resulted in a rapid and rather large increase in the endogenous concentrations of zeatin riboside (ZR), isopentenyladenosine (iAdo) and an as yet unidentified polar zeatin derivative in the node and internode below the point of decapitation. This accumulation of ZR and iAdo, was strongly reduced by the application of NAA. The observed increase in **cytokinin** concentration preceded the elongation of the lateral buds, suggesting that endogenous **cytokinins** play a significant role in the release of lateral buds from AD. However, the effect of NAA on the concentration of **cytokinins** clearly demonstrated the dominant role of the polar basipetally transported auxin in AD. The results suggest a mutual interaction between the basipolar IAA transport system and **cytokinins** obviously produced in the roots and transported via the xylem into the stem of the pea **plants**.

12/3,AB/89 (Item 20 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci
(c) 2002 Inst for Sci Info. All rts. reserv.

03950663 Genuine Article#: QU979 Number of References: 27
Title: APICAL DOMINANCE IN RHIZOMES OF QUACKGRASS, ELYTRIGIA REPENS - THE EFFECT OF AUXIN, **CYTOKININS**, AND ABSCISIC-ACID (Abstract

Available)
Author(s): TAYLOR JS; ROBERTSON JM; HARKER KN; BHALLA MK; DALY EJ; PEARCE DW
Corporate Source: AGR CANADA,RES STN,BAG SERV 5000/LACOMBE/AB T0C1S0/CANADA/; UNIV CALGARY,DEPT BIOL SCI/CALGARY/AB T2N 1N4/CANADA/
Journal: CANADIAN JOURNAL OF BOTANY-REVUE CANADIENNE DE BOTANIQUE, **1995**, V73, N2 (FEB), P307-314
ISSN: 0008-4026
Language: ENGLISH Document Type: ARTICLE
Abstract: Experiments were designed to determine the impact of abscisic acid, indole-3-acetic acid, and **cytokinins** on dormancy of quackgrass (Elytrigia repens (L.) Nevski) rhizome axillary buds using exogenous hormone treatments and analysis of endogenous hormones. Exogenous hormone treatments were applied in solution or in lanolin paste to 5-node segments of rhizome with an apical tip intact or removed. Abscisic acid **inhibited** bud growth except at concentrations of 0.5-1 mu g ..mL(-1) when it stimulated growth: this appeared to be based on an **inhibition** of apical dominance rather than a stimulation of bud growth per se. Both indole-3-acetic acid and **cytokinins** stimulated bud growth, indole-3-acetic acid at concentrations of 0.5-5 mu g . mL(-1) and **cytokinins** at higher concentrations (i.e,, 10-100 mu g mL(-1)). Indole-3-acetic acid also increased elongation of the buds, whereas abscisic acid and **cytokinins** did not. Levels of endogenous hormones were measured in bud samples: indole-3-acetic acid was quantified as its methyl ester by combined gas chromatography - mass spectrometry - selected ion monitoring; abscisic acid was quantified as its methyl ester by gas chromatography - electron capture; and **cytokinins** were quantified using a soybean callus bioassay. Hormone levels were generally higher in the most active buds of a 5-node section. Abscisic acid was also measured in buds 24 h after sheath leaf removal, a practice known to promote bud sprouting. Sheath leaf removal had no significant effect on abscisic acid levels.

12/3,AB/90 (Item 21 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03572990 Genuine Article#: PN558 Number of References: 33
Title: INCREASED LEVEL OF **CYTOKININ** RIBOSIDES IN JASMONIC ACID-TREATED POTATO (SOLANUM-TUBEROSUM) STEM NODE CULTURES (Abstract Available)
Author(s): DERMASTIA M; RAVNIKAR M; VILHAR B; KOVAC M
Corporate Source: NATL INST BIOL,KARLOVSKA 19/LJUBLJANA 61000//SLOVENIA/
Journal: PHYSIOLOGIA PLANTARUM, **1994**, V92, N2 (OCT), P241-246
ISSN: 0031-9317
Language: ENGLISH Document Type: ARTICLE
Abstract: **Cytokinin** free bases, ribosides and 9-glucosides were measured in stem node cultures of potato (Solanum tuberosum L. cv. Ulster Sceptre) in the presence or absence of 1 mu M jasmonic acid (JA) to examine whether or not their changed levels were part of the JA-induced growth response. The enhanced growth response in JA-treated **plantlets** included: expanded root systems, extended leaf areas, increased number of nodes, and enlarged stem diameters. The protein analysis revealed a substantial decrease in a 62-kDa polypeptide. On a dry weight basis, the levels of ribulose-1,5-biphosphate carboxylase/oxygenase (RuBP carboxylase, EC 4.1.1.39) and chlorophylls a and b were constant. The total concentration of endogenous **cytokinins** remained virtually the same in control and treated **plantlets**; but in JA-treated **plantlets** the amount of **cytokinin** free bases and **cytokinin** 9-glucosides decreased. In addition, the level of **cytokinin** ribosides was elevated. The ratio between active and inactive **cytokinins** increased from 1.2

to 2.1, which correlates with the enhanced growth of potato **plantlets** grown on 1 mu M JA. Thus the observed growth and developmental changes may be a consequence of the measured altered **cytokinin** level. However, significant morphological alterations of the potato **plantlets** treated with JA may also be a result of the changed critical **cytokinin** concentration or critical ratios of **cytokinins** to auxins and JA, rather than their absolute concentrations.

12/3,AB/91 (Item 22 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03419064 Genuine Article#: NE203 Number of References: 156
Title: BACTERIAL GENES MODIFYING HORMONAL BALANCES IN **PLANTS** (Abstract Available)
Author(s): GAUDIN V; VRAIN T; JOUANIN L
Corporate Source: INRA,BIOL CELLULAIRE LAB,ROUTE ST CYR/F-78026 VERSAILLES//FRANCE/; AGR CANADA,RES STN/VANCOUVER V6T 1X2/BC/CANADA/
Journal: PLANT PHYSIOLOGY AND BIOCHEMISTRY, **1994**, V32, N1 (JAN-FEB) , P11-29
ISSN: 0981-9428
Language: ENGLISH Document Type: REVIEW
Abstract: A number of microorganisms that interact with **plants** use the same hormonal signals as **plants**. Four phytopathogenic bacteria causing either ''olive knot'' disease, ''leafy galls'', ''crown gall'' or ''hairy root'' disease in **plants** are among those most studied. The last two species induce proliferation resembling normal tissue and organ formation. Crown gall and hairy root are due to the **expression** of oncogenes carried on a bacterial DNA fragment, which is transferred and integrated into the **plant** genome during infection. These oncogenes modify the **plant** hormonal balances or the hormone signal perception of the cells. In this review, we describe the different types of oncogenes present in several microorganisms, their functions when they are known, and die morphological, physiological, and developmental modifications that are induced when these oncogenes are introduced into **plants**.

12/3,AB/92 (Item 23 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03268060 Genuine Article#: NT120 Number of References: 44
Title: ONCOGENE ARRANGEMENT IN A SHOOTY STRAIN OF AGROBACTERIUM-TUMEFACIENS (Abstract Available)
Author(s): DREVET C; BRASILEIRO ACM; JOUANIN L
Corporate Source: INRA,BIOL CELLULAIRE LAB,ROUTE ST CYR/F-78026 VERSAILLES//FRANCE/; INRA,BIOL CELLULAIRE LAB/F-78026 VERSAILLES//FRANCE/
Journal: PLANT MOLECULAR BIOLOGY, **1994**, V25, N1 (APR), P83-90
ISSN: 0167-4412
Language: ENGLISH Document Type: ARTICLE
Abstract: The Agrobacterium tumefaciens nopaline strain 82. 139 induces non-teratogenic shooty tumours on several **plant** species. We have determined the position of the T-region oncogenes in a 11.4 kb Xba I fragment which shows a general organization similar to its pTiC58 counterpart. Sequence analysis of the 4.7 kb right part of this fragment allowed us to identify the pTi82.139 **ipt**, 6b and nos coding sequences. pTi82.139 lacks the 6a gene, which lies between the **ipt** and 6b genes in pTiC58. The intervening region between the 6b and the nos genes contains an additional ORF with homology to ORF 21 (transcript 3') from the TR-DNA of octopine strain pTi15955.

12/3,AB/93 (Item 24 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03150931 Genuine Article#: NJ081 Number of References: 45
Title: THE FAS OPERON OF RHODOCOCCUS FASCIANS ENCODES NEW GENES REQUIRED FOR EFFICIENT FASCIATION OF HOST **PLANTS** (Abstract Available)
Author(s): CRESPI M; VEREECKE D; TEMMERMAN W; VANMONTAGU M; DESOMER J
Corporate Source: STATE UNIV GHENT,GENET LAB,KL LEDEGANCKSTR 35/B-9000 GHENT//BELGIUM/; STATE UNIV GHENT,GENET LAB/B-9000 GHENT//BELGIUM/
Journal: JOURNAL OF BACTERIOLOGY, **1994**, V176, N9 (MAY), P2492-2501
ISSN: 0021-9193
Language: ENGLISH Document Type: ARTICLE
Abstract: Three virulence loci (fas, aft, and hgp) of Rhodococcus fascians D188 have been identified on a 200-kb conjugative linear plasmid (pFiD188). The fns locus was delimited to a 6.5-kb DNA fragment by insertion mutagenesis, single homologous disruptive recombination, and in trans complementation of different avirulent insertion mutants. The locus is arranged as a large operon containing six open reading frames whose **expression** is specifically induced during the interaction with host **plants**. One predicted protein is homologous to P-450 cytochromes from actinomycetes. The putative ferredoxin component is of a novel type containing additional domains homologous to transketolases from chemoautotrophic, photosynthetic, and methylotrophic microorganisms. Genetic analysis revealed that fas encodes, in addition to the previously identified **ipt**, at least two new genes that are involved in fasciation development, one of which is only required on older tobacco **plants**.

12/3,AB/94 (Item 25 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

03077941 Genuine Article#: NA966 Number of References: 25
Title: BRANCHING MUTANT RMS-2 IN PISUM-SATIVUM - GRAFTING STUDIES AND ENDOGENOUS INDOLE-3-ACETIC-ACID LEVELS (Abstract Available)
Author(s): BEVERIDGE CA; ROSS JJ; MURFET IC
Corporate Source: UNIV TASMANIA,DEPT PLANT SCI,GPO BOX 252C/HOBART/TAS 7001/AUSTRALIA/
Journal: PLANT PHYSIOLOGY, **1994**, V104, N3 (MAR), P953-959
ISSN: 0032-0889
Language: ENGLISH Document Type: ARTICLE
Abstract: Isogenic lines of pea (Pisum sativum L.) were used to determine the physiological site of action of the Rms-2 gene, which maintains apical dominance, and its effect on endogenous free indole-3-acetic acid (IAA) levels. In mutant rms-2 scions, which normally produce lateral branches below node 3 and above node 7, apical dominance was almost fully restored by grafting to Rms-2 (wildtype) stocks. In the reciprocal grafts, rms-2 stacks did not promote branching in wild-type shoots. Together, these results suggest that the Rms-2 gene **inhibits** branching in the shoot of pea by controlling the synthesis of a translocatable (hormone-like) substance that is produced in the roots and/or cotyledons and in the shoot. At all stages, including the stage at which aerial lateral buds commence outgrowth, the level of IAA in rms-a shoots was elevated (up to 5-fold) in comparison with that in wild-type shoots. The internode length of rms-2 **plants** was 40% less than in wild-type **plants**, and the mutant **plants** allocated significantly more dry weight to the shoot than to the root in comparison with wild-type **plants**. Crafting to wild-type stocks did not normalize IAA levels or internode length in rms-2 scions, even though it **inhibited** branching,

suggesting that the involvement of Rms-2 in the control of IAA level and internode length may be confined to processes in the shoot.

12/3,AB/95 (Item 26 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02704244 Genuine Article#: LX867 Number of References: 55
Title: APPLICATION OF **CYTOKININS** TO FLOWERS TO INCREASE POD SET IN LUPINUS-ANGUSTIFOLIUS L (Abstract Available)
Author(s): ATKINS CA; PIGEAIRE A
Corporate Source: UNIV WESTERN AUSTRALIA,DEPT BOT/NEDLANDS/WA 6009/AUSTRALIA/; UNIV WESTERN AUSTRALIA,COOPERAT RES CTR LEGUMESMEDITERRANEAN AGR/NEDLANDS/WA 6009/AUSTRALIA/
Journal: AUSTRALIAN JOURNAL OF AGRICULTURAL RESEARCH, **1993**, V44, N8 , P1799-1819
ISSN: 0004-9409
Language: ENGLISH Document Type: ARTICLE
Abstract: Exogenous application of a 2 mol m-3 buffered solution of N6-benzylamninopurine (BAP) to flowers on the main stem inflorescence of Lupinus angustifolius L. cv. Danja profoundly altered reproductive development by reducing post-anthesis abscission of flowers and small pods. The same effect of BAP was recorded for a mutant (abs-) of cv. Danja, in which organ abscission was completely absent, indicating that localized application of **cytokinin** enhanced reproductive development rather than reduced pedicel abscission per se in the parent line. Application to pedicel and sepals at the open flower stage completely eliminated flower abortion on the main inflorescence, compared with less than 50% pod initiation on untreated inflorescences, more than doubled final pod yield on the main inflorescence and increased the number of mature pods on the whole **plant** by 33%. A single dose of BAP, to an inflorescence which bore flowers ranging in their stage of development from post-anthesis to immature flower buds, significantly increased the number of pods initiated and at final harvest, measured on a per **plant** basis. A number of synthetic and naturally occurring **cytokinins**, including zeatin riboside and dihydrozeatin riboside, were also effective. BAP application induced a longer period of flowering and resulted in a considerably thickened raceme. This was most marked at the distal end which showed enhanced cambial development, and secondary vascularization compared with untreated controls. The positive effects of BAP application on pod initiation were not restricted to cv. Danja but were found also for cv. Warrah and cv. Gungurru, both of which have enhanced pod set compared with Danja. Enhanced pod initiation on the main inflorescence generally reduced the number of pods developing on branch inflorescences. Additional application of BAP to flowers on branches, even at the most opportune time and at the most effective site, did not enhance pod initiation and, in some cases, significantly reduced pod set on these branches. The data indicate that it would be very difficult to exploit the positive effect of exogenous **cytokinin** application on pod set in field crops of lupin. However, selection or genetic engineering of **plants** with higher levels of endogenous **cytokinins** in flowers or flower parts at anthesis may provide a means by which to assess the importance of this factor in determining yield stability.

12/3,AB/96 (Item 27 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02507635 Genuine Article#: LG170 Number of References: 54
Title: HORMONAL CHARACTERIZATION OF TRANSGENIC TOBACCO **PLANTS** **EXPRESSING** THE ROLC GENE OF AGROBACTERIUM-RHIZOGENES TL-DNA (

Abstract Available)
Author(s): NILSSON O; MORITZ T; IMBAULT N; SANDBERG G; OLSSON O
Corporate Source: SWEDISH UNIV AGR SCI,DEPT FOREST GENET & PLANT PHYSIOL/S-90183 UMEA//SWEDEN/; SWEDISH UNIV AGR SCI,DEPT FOREST GENET & PLANT PHYSIOL/S-90183 UMEA//SWEDEN/; UMEA UNIV,DEPT PLANT PHYSIOL/S-90187 UMEA//SWEDEN/
Journal: PLANT PHYSIOLOGY, **1993**, V102, N2 (JUN), P363-371
ISSN: 0032-0889
Language: ENGLISH Document Type: ARTICLE
Abstract: Transgenic tobacco (Nicotiana tabacum L. cv Wisconsin 38) **plants expressing** the Agrobacterium rhizogenes rolC gene under the control of the cauliflower mosaic virus 35S RNA promoter were constructed. These **plants** displayed several morphological alterations reminiscent of changes in indole-3-acetic acid (IAA), **cytokinin**, and gibberellin (GA) content. However, investigations showed that neither the IAA pool size nor its rate of turnover were altered significantly in the rolC **plants**. The biggest difference between rolC and wild-type **plants** was in the concentrations of the **cytokinin**, isopentenyladenosine (iPA) and the gibberellin GA19. Radioimmunoassay and liquid chromatography-mass spectrometry measurements revealed a drastic reduction in rolC **plants** of iPA as well as in several other **cytokinins** tested, suggesting a possible reduction in the synthesis rate of **cytokinins**. Furthermore, gas chromatography-mass spectrometry quantifications of GA19 showed a 5- to 6-fold increase in rolC **plants** compared with wild-type **plants**, indicating a reduced activity of the GA19 oxidase, a proposed regulatory step in the gibberellin biosynthesis. Thus, we conclude that RolC activity in transgenic **plants** leads to major alterations in the metabolism of **cytokinins** and gibberellins.

12/3,AB/97 (Item 28 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02452864 Genuine Article#: LC487 Number of References: 36
Title: LEVELS AND LOCATION OF **EXPRESSION** OF THE AGROBACTERIUM-TUMEFACIENS PTIA6 **IPT** GENE PROMOTER IN TRANSGENIC TOBACCO (Abstract Available)
Author(s): STRABALA TJ; CROWELL DN; AMASINO RM
Corporate Source: UNIV MISSOURI,DEPT BIOCHEM,117 SCHWEITZER HALL/COLUMBIA//MO/65211; UNIV WISCONSIN,DEPT BIOCHEM/MADISON//WI/53706; INDIANA UNIV PURDUE UNIV,DEPT BIOL/INDIANAPOLIS//IN/46202
Journal: PLANT MOLECULAR BIOLOGY, **1993**, V21, N6 (MAR), P1011-1021
ISSN: 0167-4412
Language: ENGLISH Document Type: ARTICLE
Abstract: The location of gene **expression** of the Agrobacterium tumefaciens **ipt** gene promoter in transgenic tobacco **plants** was examined using the beta-glucuronidase (GUS) reporter gene. **Expression** of GUS was detected in every organ and most cell types examined. The highest levels of GUS activity were found in roots. To further examine the transcriptional basis of this broad **expression** pattern, deletions in the 5' noncoding region of the gene were translationally fused to two promoterless reporter genes, encoding the enzymes chloramphenicol acetyl **transferase** (CAT) and beta-glucuronidase (GUS). Reporter enzyme assays revealed the existence of an upstream segment required for maximal promoter function, the 5' end of which is between -442 and -408 of the P(**ipt**) ATG codon. This upstream segment is required for maximal levels of GUS **expression** in roots, but not in other organs, and a tobacco suspension-cultured cell line. The implications of broad **ipt** **expression** on the process of crown gall tumorigenesis are discussed.

12/3,AB/98 (Item 29 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

02342510 Genuine Article#: KV327 Number of References: 51
Title: HORMONAL CONTENT AND SENSITIVITY OF TRANSGENIC TOBACCO AND POTATO **PLANTS EXPRESSING** SINGLE ROL GENES OF AGROBACTERIUM-RHIZOGENES T-DNA (Abstract Available)
Author(s): SCHMULLING T; FLADUNG M; GROSSMANN K; SCHELL J
Corporate Source: UNIV TUBINGEN,LEHRSTUHL ALLGEMEINE GENET,MORGENSTELLE 28/W-7400 TUBINGEN 1//GERMANY/; MAX PLANCK INST ZUCHTUNGSFORSCH/W-5000 COLOGNE 30//GERMANY/; BASF,LANDWIRTSCHAFT VERSUCHSSTN/W-6703 LIMBURGERHOF//GERMANY/
Journal: PLANT JOURNAL, **1993**, V3, N3 (MAR), P371-382
ISSN: 0960-7412
Language: ENGLISH Document Type: ARTICLE
Abstract: The **expression** of single rol genes of the T(L)-DNA of Agrobacterium rhizogenes strain A4 in transgenic tobacco (Nicotiana tabacum L.) and potato (Solanum tuberosum L.) **plants** alters the internal concentrations of, and the sensitivity to, several **plant** hormones. The levels of immunoreactive **cytokinins**, abscisic acid, gibberellins and indole-3-acetic acid were analysed in tissues of the apical shoots, stems, leaves, roots and undifferentiated callus tissue. The addition of the dominant and morphogenetically active rolA, rolB, or rolC genes resulted in alterations in the content of several hormones. rolC overexpression in particular led to an up to fourfold increase in the content of isopentenyladenosine, dihydrozeatin riboside and trans-zeatin riboside-type **cytokinins** in potato **plants**. This increase correlated well with different levels of **expression** of the rolC gene in different transgenic **plants**. Furthermore it was shown that the dwarfism of P35s-rolC transgenic tobacco and potato **plants** is correlated with a 28-60% reduction of gibberellic acid A1 concentration in apical shoots. Exogenous addition of gibberellic acid completely restored stem elongation in P35S-rolC transgenic **plants**. Apical shoots of dwarf rolA transgenic tobacco **plants** also contained 22% less gibberellic acid A1 than control **plants**, but growth cannot be restored completely by exogenously added gibberellic acid. Similarly, the sensitivity of transgenic tobacco seedlings or callus tissues towards different phytohormone concentrations can be altered by the **expression** of single rol genes. The overexpression of the rolC gene in seedlings led to an altered response to auxins, **cytokinins**, abscisic acid, gibberellic acid and the ethylene precursor 1-aminocyclopropane-carboxylic acid. The overexpression of the rolB gene in tobacco calli led to necrosis at lower auxin concentrations than in the wild-type, while other parameters of auxin action, like the induction of cell growth, remained unchanged.

12/3,AB/99 (Item 30 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

01813216 Genuine Article#: JD358 Number of References: 25
Title: EFFECTS OF AGROBACTERIAL ONCOGENES IN KIDNEY VETCH (ANTHYLLIS-VULNERARIA L) (Abstract Available)
Author(s): STILLER J; NASINEC V; SVOBODA S; NEMCOVA B; MACHACKOVA I
Corporate Source: CZECHOSLOVAK ACAD SCI,INST PLANT MOLEC BIOL,DEPT NITROGEN FIXAT,BRANISOVSKA 31/CS-37005 CESKE BUDEJOVICE//CZECHOSLOVAKIA/; CZECHOSLOVAK ACAD SCI,INST EXPTL BOT/CS-16000 PRAGUE 6//CZECHOSLOVAKIA/
Journal: PLANT CELL REPORTS, **1992**, V11, N7 (JUL), P363-367
Language: ENGLISH Document Type: ARTICLE

Abstract: Kidney vetch seedlings were induced to form hairy roots by inoculating their mesocotyls with the wild-type strain 15834 of Agrobacterium rhizogenes or with the A. tumefaciens strain C58Cl containing a binary vector system (the pRiA4b as a helper and the vector pCB1346 bearing a pTiC58-derived **isopentenyl transferase** gene (**ipt**, **cytokinin** biosynthetic gene) under control of its native regulatory sequences). Transgenic lines of three distinct phenotypes were selected: (i) Typically, the pRi15834-transformed tissues were stabilized in vitro and maintained for long periods as aseptic, fast-growing, hormone-independent, plagiotropic hairy root cultures which never regenerated shoots and lost the ability to synthesize opines. Their genomic DNA contained both the T(L)- and the T(R)-DNA. (ii) One of the HR-lines transgenic for the T-DNA of pRi15834 (named 52AV34) started to regenerate spontaneously into teratomous shoots. The shoots were found to produce opines and both the T(L) and T(R) parts of T-DNA were found to be partly deleted and/or rearranged. They contained phytohormones in similar levels as those found in seed-born shoots. (iii) A practically identical morphogenic response as in the line 52AV34 was observed in the clone 27AV46. However, its shooty, dark-green, slow-growing teratomas were proven to be kanamycin-resistant, opine-producing, and double-transformed by the pRiA4b sequences and the **ipt** gene. They over-produced auxins as well as **cytokinins** (mainly indoleacetylaspartic acid and ribosides of zeatin and isopentenyladenine).

12/3,AB/100 (Item 31 from file: 34)
DIALOG(R)File 34:SciSearch(R) Cited Ref Sci

01048832 Genuine Article#: FR384 Number of References: 26
Title: EFFECTS OF THE INTRODUCTION OF AGROBACTERIUM-TUMEFACIENS T-DNA **IPT** GENE IN NICOTIANA-TABACUM-L CV PETIT HAVANA SR1 **PLANT** -CELLS (Abstract Available)
Author(s): BEINSBERGER SEI; VALCKE RLM; DEBLAERE RY; CLIJSTERS HMM; DEGREEF JA; VANONCKELEN HA
Corporate Source: UNIV INSTELLING ANTWERP,DEPT BIOL/B-2610 WILRIJK//BELGIUM/; LIMBURGS UNIV CENTRUM,DEPT SBM/B-3590 DIEPENBEEK//BELGIUM/; STATE UNIV GHENT,GENET LAB/B-9000 GHENT//BELGIUM/
Journal: PLANT AND CELL PHYSIOLOGY, **1991**, V32, N4, P489-496
Language: ENGLISH Document Type: ARTICLE
Abstract: Transformation of tobacco leaf discs with the '**cytokinin**' **ipt** gene yielded several transgenic callus tissue lines, respective to the kind of **ipt** construction present in the A. tumefaciens cointegrates. Those calli containing an active **ipt** gene were able to grow hormone-autotrophically and showed an increased endogenous **cytokinin** level in comparison with controls. Analysis of endogenous IAA level did not allow any quantitative correlation with the **cytokinin** content. However, a minimal level of auxin seems to be necessary to obtain hormone-autotrophic growth. Exogenously supplied NAA significantly reduced the endogenous **cytokinin** content without modifying growth characteristics.

The varying chlorophyll content in the different callus lines elicited the study of the ultrastructure of the plastids. The controls contained small plastids, often filled with starch or accumulated vesicles that did not allow observation of the internal membrane system. The 'Pssu-**ipt**' line, having a higher **cytokinin** content, showed plastids with an internal membrane system consisting of stroma and grana thylakoids, but this structure was lost during subculture. Swollen thylakoids appeared, the amount of starch was reduced and vesicles were accumulating.

12/3,AB/101 (Item 1 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03511143 CAB Accession Number: 981602461
The role of a biosynthetic **cytokinin** gene in regulating **expression** of a class of pathogenesis-related protein genes in tobacco **plants**.
Ma QingHu; Song YanRu; Sun JingSan
Institute of Botany, Academia Sinica, Beijing 100093, China.
Acta Botanica Sinica vol. 38 (11): p.870-874
Publication Year: 1996
ISSN: 0577-7496 --
Language: Chinese Summary Language: english
Document Type: Journal article
Expression of basic chitinase, beta -1, 3-glucanase, osmotin and extensin were studied in subcultured seedlings of tobacco cv. Wisconsin 38 growing on MS medium. Total RNA was isolated from tobacco tissues and fractionated on formaldehyde 1.5% agarose gels, blotted onto nylon membranes and hybridized against radioactive probes. Results showed that these 4 genes were regulated in a developmental and organ-specific manner. In transgenic fascicular shoots which contain the active **cytokinin** biosynthetic gene (**ipt**) from Agrobacterium tumefaciens, **expression** of these 4 genes was co-regulated by overproduction of endogenous **cytokinins**. Heat shock also decreased steady-state levels of the four mRNAs. 14 ref.

12/3,AB/102 (Item 2 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03450465 CAB Accession Number: 971610583
Properties of plasma membranes of Phsp 70-**ipt** transformed tobacco (Nicotiana tabacum).
Bultynck, L.; Geuns, J. M. C.; Ginkel, G. van; Caubergs, R. J.
Ruca, Groenenborgerlaan 171, 2020 Antwerp, Belgium.
Phytochemistry vol. 45 (7): p.1337-1341
Publication Year: 1997
ISSN: 0031-9422 --
Language: English
Document Type: Journal article
Application of 10 successive daily heat shocks reduced the growth of control tobacco (Nicotiana tabacum cv. Petit Havana SR1) **plants** by about 15%; for Phsp 70-**ipt** transformed **plants** this was about 48%. The shoot diameter of these **ipt**-transformed **plants** increased by about 75%. In addition, in heat shock treated **ipt**-**plants** (**IPT** -HS) the upper lateral buds grew out due to a reduction of apical dominance. The older leaves of **IPT**-HS **plants** had a higher chlorophyll content. In spite of the observed effects due to a higher endogenous **cytokinin** content in the **IPT**-HS **plants** , no significant changes were observed on the plasma membrane fatty acid composition, nor on its fluidity as determined from the steady-state fluorescence anisotropy of DPH. Only a minor change in the plasma membrane free sterol composition was found as evidenced by a 20% decrease in the stigmasterol to sitosterol ratio in **IPT**-HS, indicative for a possible anti-senescence effect of enhanced endogenous **cytokinins** , but without significant effects on the plasma membrane function. 26 ref.

12/3,AB/103 (Item 3 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03400637 CAB Accession Number: 970607533
Auxin-**cytokinin** interactions in transgenic **plants** **expressing** the A. tumefaciens **ipt**, iaaaM and iaaaH genes.
Eklof, S.
Department of Forest Genetics and Plant Physiology, Swedish University of Agricultural Sciences, S-901 83 Umea, Sweden.
Acta Universitatis Agriculturae Sueciae - Silvestria (No. 15): 45 pp.
Publication Year: 1996
Publisher: Swedish University of Agricultural Sciences -- Uppsala, Sweden
ISBN: 91-576-5219-8
Language: English Summary Language: swedish
Document Type: Thesis
The thesis is based on six papers (included as an appendix), and presents results from studies on how **plant** morphology is influenced by **cytokinins** and auxins, their metabolism and interactions. The studies were mainly conducted with tobacco **plants** (Nicotiana tabacum cultivars), with hybrid aspen (Populus tremula x P. tremuloides) chosen for transformation with the promoter-less **ipt** gene. Protein synthesis in the cambial region of Scots pine (Pinus sylvestris) shoots during reactivation was also studied; understanding and control of growth and development of commercial Swedish forest species such as Scots pine is a long-term aim. 8 pp. of ref.

12/3,AB/104 (Item 4 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03392367 CAB Accession Number: 971606920
The **expression** of GUS gene driven by T-cyt promoter in transgenic tobacco and potato.
Ma Mi; Zhou DaFeng; Guo Yang; Kuang TingYun; Tang PeiSong; Lin ZhongPing
Institute of Botany, Academia Sinica, Beijing 100093, China.
Acta Botanica Sinica vol. 38 (3): p.169-173
Publication Year: 1996
ISSN: 0577-7496 --
Language: Chinese Summary Language: english
Document Type: Journal article
The location of GUS (uidA) gene **expression** under control of the T-cyt gene promoter (gene 4 of T-DNA encoding **isopentenyl** **transferase**) (from Agrobacterium tumefaciens) was examined by biochemical assays in transgenic tobacco (Nicotiana tabacum cv. W38) and potato (Solanum tuberosum cv. Desiree) **plants**. Results showed that T-cyt was **expressed** in roots, stems, leaves and buds, and the highest levels of GUS activity were found in tobacco stems during axillary bud initiation and in potato buds on tubers. Levels of **expression** were also high in wounded leaves of transgenic potato. GUS **expression** was induced in transgenic tobacco stems by **cytokinin** treatment but not by auxin treatment, indicating that the T-cyt promoter might be selectively induced by exogenous **plant** hormones. 11 ref.

12/3,AB/105 (Item 5 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03379177 CAB Accession Number: 971605619
Growth pattern, tuber formation and hormonal balance in in vitro potato **plants** carrying **ipt** gene.

Machackova, I.; Sergeeva, L.; Ondrej, M.; Zaltsman, O.; Konstantinova, T.; Eder, J.; Ovesna, J.; Golyanovskaya, S.; Rakitin, Y.; Aksenova, N.
De Montfort University, Norman Borlaug Institute for Plant Sciences, Institute of Experimental Botany, Academy of Sciences of the Czech Republic, Ke dvoru 15, 166 00 Prague 6, Czech Republic.
Plant Growth Regulation vol. 21 (1): p.27-36
Publication Year: 1997
ISSN: 0167-6903 --
Language: English
Document Type: Journal article
Nodal cuttings of in vitro grown potato (Solanum tuberosum cv. Miranda) **plants** were transformed by a vector plasmid carrying **ipt** (**isopentenyl transferase**) gene of Agrobacterium tumefaciens. From the initial teratoma stage, 5 clones of transgenic **plants** were obtained, which displayed, in varying degree, shortening of internodes, decreased leaf size, decreased apical dominance and poor rooting. In addition, two of the clones showed increased stolon and tuber formation. In all these clones the endogenous level of free **cytokinins** (CKs) was increased by 40% to almost 300%. Also, free IAA level was increased, but to a lower degree; the highest increase was 160%. Applied kinetin or IAA (1 mg l-1) strongly suppressed root and tuber formation in two of the clones, although they did not affect or even stimulated these processes in control **plants**. For control **plants** the minimal medium sucrose concentration necessary for tuber initiation was 6%, whereas in one clone 2% was sufficient. Differences in the distribution of endogenous CKs and IAA was observed between one clone and control **plants**. CK content was highest in transgenic **plants** in stems and in controls in leaves. In one clone, the abscisic acid level was significantly increased in comparison to the control throughout the cultivation period. Ethylene formation was strongly increased during the first week after subcultivation, and later on the difference between transgenic and control **plants** rapidly diminished. Reactions of **plants** of one clone to red (RL) and blue light (BL) were similar to reactions of control **plants**: in RL **plants** were tall and thin with stunted leaves, in BL they had a teratoma-like appearance and formed a very high number of tubers. The role of hormones in these changes in growth and tuber formation is discussed. 36 ref.

12/3,AB/106 (Item 6 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03305917 CAB Accession Number: 961611504
Effect of **cytokinin** on alkaloid accumulation in periwinkle callus cultures transformed with a light-inducible **ipt** gene.
Garnier, F.; Carpin, S.; Label, P.; Creche, J.; Rideau, M.; Hamdi, S.
EA 1370, Laboratoire de Biologie Cellulaire et Biochimie Vegetale, Faculte de Pharmacie, 31 avenue Monge, 37200 Tours, France.
Plant Science (Limerick) vol. 120 (1): p.47-55
Publication Year: 1996
ISSN: 0168-9452 --
Language: English
Document Type: Journal article
The effect of **cytokinins** on accumulation of indole alkaloids in periwinkle (Catharanthus roseus) callus cultures was investigated. Firstly, it was found that exogenously-applied **cytokinin** increased the ajmalicine and serpentine content of untransformed callus culture obtained from cotyledons. Secondly, periwinkle cotyledons were transformed with the **isopentenyl transferase** (**ipt**) gene under the control of a light-inducible promoter and two transformed callus lines were used in order to investigate whether endogenously-produced **cytokinin** could also increase the alkaloid production. It was found that the **ipt**-transgenic tissues accumulated higher levels of

isopentenyl transferase transcripts as well as zeatin riboside, even under non-inductive condition, but lower concentration of alkaloids compared to that of untransformed tissues. A 28 kDa polypeptide whose accumulation was previously found to be associated with alkaloid production in a periwinkle cell suspension was also present in the non-transformed tissue and its level was increased in parallel to the **cytokinin** -enhanced alkaloid production. Neither light induction condition, nor exogenous **cytokinin** treatment led to the increase of the 28 kDa polypeptide accumulation in the transformed tissues. All these data show that endogenously-produced **cytokinin** does not mimic the effect of exogenously-applied **cytokinin** on the alkaloid production in periwinkle calli. 34 ref.

12/3,AB/107 (Item 7 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03305846 CAB Accession Number: 961611433

Transgenic periwinkle tissues overproducing **cytokinins** do not accumulate enhanced levels of indole alkaloids.

Garnier, F.; Label, P.; Hallard, D.; Chenieux, J. C.; Rideau, M.; Hamdi, S.

EA 1370, Laboratoire de Biologie Cellulaire et Biochimie Vegetale, Faculte de Pharmacie, 31 avenue Monge, 37200 Tours, France.

Plant Cell, Tissue and Organ Culture vol. 45 (3): p.223-230
Publication Year: 1996
ISSN: 0167-6857 --
Language: English
Document Type: Journal article

Cytokinins play a critical role in several aspects of **plant** growth, metabolism and development. It has been reported previously that adding **cytokinins** to the culture medium of a suspension-cultured cell line of periwinkle (Catharanthus roseus) increased the accumulation of indole alkaloids. Studies were conducted to investigate the effects of exogenously applied **cytokinins** and elevated levels of endogenous **cytokinins** on indole alkaloid production. An Agrobacterium tumefaciens strain yielding a plasmid with the **isopentenyl transferase** gene under control of its own promoter was used. Co-culture of suspension cells with the bacteria caused a severe stress response leading to cell necrosis; thus, this material was not transformed. However, periwinkle cotyledons were successfully transformed. It was confirmed that callus cultures generated from the **isopentenyl transferase**-transgenic cotyledons accumulated high **cytokinin** concentrations. Treating normal callus cultures (generated from untransformed cotyledons) with **cytokinins** enhanced their alkaloid production. In contrast, the enhanced concentration of endogenous **cytokinins** in transgenic calluses did not increase indole alkaloid production, and thus did not mimic the effect of exogenously applied **cytokinins**. Hypotheses to explain this discrepancy are discussed. 33 ref.

12/3,AB/108 (Item 8 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03305776 CAB Accession Number: 961611363

Effect of alien **ipt** gene on hormonal concentrations of **plants**.

Makarova, R. V.; Borisova, T. A.; Machackova, I.; Kefeli, V. I.

Timiryazev Institute of Plant Physiology, Russian Academy of Sciences, ul. Botanicheskaya 35, Moscow 127276, Russia.

Plant hormone signal perception and transduction: Proceedings of

the International Symposium, Moscow, Russia, September 4-10, 1994.
Conference Title: Plant hormone signal perception and transduction: Proceedings of the International Symposium, Moscow, Russia, September 4-10, 1994.
p.171-173
Publication Year: 1996
Editors: Smith, A. R.; Berry, A. W.; Harpham, N. V. J.; Moshkov, I. E.; Novikova, G. V.; Kulaeva, O. N.; Hall, M. A.
Publisher: Kluwer Academic Publishers -- Dordrecht, Netherlands
ISBN: 0-7923-3768-9
Language: English
Document Type: Conference paper
Transgenic **plants** carrying the **isopentenyl transferase** gene (**ipt**) and normal tobacco **plants** (Nicotiana tabacum) were analysed to compare their phytohormone status. Total **cytokinin** (zeatin, zeatin riboside, isopentenyladenine and isopentenyladenosine) level and free IAA content were always higher in shoots regenerated from transgenic cultures although the concentrations were lower in roots. In transgenic **plants**, IAA-oxidase activity was lower and the concentration of its protectant chlorogenic acid was increased. Transgenic **plants** also contained lower concentrations of abscisic acid. 14 ref.

12/3,AB/109 (Item 9 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03282106 CAB Accession Number: 961609747
Photosynthesis in transgenic Pssu-**ipt** tobacco **plants** as affected by water stress.
Synkova, H.; Pospisilova, J.; Valcke, R.
Institute of Experimental Botany, Na Karlovce 1a, 160 00 Prague 6, Czech Republic.
Photosynthesis: from light to biosphere. Volume IV. Proceedings of the Xth International Photosynthesis Congress, Montpellier, France, 20-25 August 1995.
Conference Title: Photosynthesis: from light to biosphere. Volume IV. Proceedings of the Xth International Photosynthesis Congress, Montpellier, France, 20-25 August 1995.
p.561-564
Publication Year: 1995
Editors: Mathis, P.
Publisher: Kluwer Academic Publishers -- Dordrecht, Netherlands
ISBN: 0-7923-3860-X
Language: English
Document Type: Conference paper
In order to determine if water deficit which occurs in **ipt** (**isopentenyl transferase** (which catalyses the initial step in **cytokinin** biosynthesis)) transgenic **plants** especially in the light originates from suppression of the root system or from effects on stomatal opening, studies were made of **plants** of Nicotiana tabacum cv. Petit Havana SR1 transformed for the **ipt** gene under the control of the Pssu promoter. Compared to wild type **plants**, transgenic **plants** exhibited: (1) an approximately 6-fold increase in endogenous **cytokinin** content but the same or lower abscisic acid content; (2) severely affected electron transport around photosystem (PS) I but not PSII; (3) low stomatal conductance and water potential mainly in mature and older leaves, probably the result of a poor root system; (4) lower photosynthesis and higher photorespiration due possibly to closed stomata and permanent water and CO2 deficits; and (5) no marked disturbances in PSII functioning, indicating the presence of very efficient water stress defence mechanisms. 7 ref.

12/3,AB/110 (Item 10 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03242698 CAB Accession Number: 961606308
Agrobacterium-mediated transformation of commercial mints.
Berry, C.; Eck, J. M. van; Kitto, S. L.; Smigocki, A.
Delaware Agricultural Experiment Station, Department of Plant and Soil Sciences, College of Agricultural Sciences, University of Delaware, Newark, DE 19717-1303, USA.
Plant Cell, Tissue and Organ Culture vol. 44 (2): p.177-181
Publication Year: 1996
ISSN: 0167-6857 --
Language: English
Document Type: Journal article
Commercial peppermint (P; Mentha x piperita cv. Black Mitcham), native spearmint (NS; M. spicata) and Scotch spearmint (SS; M. x gracillis (M. x gracilis) cv. Baker) petioles, and orange mint (OM; M. (piperita var.) citrata) leaf discs were cocultivated with a number of Agrobacterium tumefaciens strains. P, SS and OM initiated tumour-like callus tissue on growth regulator-free MS medium after cocultivation with strain A281, a hypervirulent agropine strain containing Ti plasmid pTiBo542. Callus did not initiate from explants cocultivated with strain C58, a virulent nopaline strain, with A136, a plasmidless strain, or from uninoculated controls. A281-derived callus was maintained on growth regulator-free medium in the absence of antibiotics for up to two years with no bacterial outgrowth. No shoots regenerated from any of the tumours on regeneration medium. Five of seven OM callus lines assayed gave a positive signal for agropine. DNA extracted from OM tumour tissue hybridized to a DNA probe specific to the T-DNA region of pTi plasmid. Genomic Southern analysis of DNA from tumours of P and SS indicated that one to a few copies of the T-DNA integrated into the mint chromosomes. PCR amplification of genomic DNA with primers specific for one of the T-DNA encoded genes yielded fragments that, when analysed by restriction enzyme mapping and on Southern blots, corresponded to the **cytokinin** biosynthesis gene **ipt** (**isopentenyl transferase**). These results demonstrate transformation of three species of mint and the potential for using A. tumefaciens to transfer economically important genes into commercial mint cultivars. 11 ref.

12/3,AB/111 (Item 11 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03191981 CAB Accession Number: 961602281
The pattern of **cytokinin** content in transgenic and wild-type tobacco seedlings as affected by heat shock.
Veselov, S. Y.; Kudoyarova, G. R.; Mustafina, A. R.; Valcke, R.
Institute of Biology, Bashkir Scientific Center, Russian Academy of Sciences, pr. Oktyabrya 69, Ufa, Bashkortostan 450054, Russia.
Russian Journal of Plant Physiology vol. 42 (5): p.617-620
Publication Year: 1995
ISSN: 1021-4437 --
Language: English
Document Type: Journal article
The pattern of the endogenous **cytokinin** content was monitored during the day in the shoots of transgenic tobacco (Nicotiana tabacum) **plants** containing a heat-inducible **ipt** gene responsible for **isopentenyl transferase** synthesis. Heating transgenic **plants** at 40 deg C for 1 h yielded an increase in endogenous **cytokinins**, as compared to the normal level in the **plants** kept at 24 deg C for the whole period. However, this increase was not permanent, as after 5 h following heat-shock treatment, there was

essentially no difference in **cytokinin** content between heated and untreated **plants** . In the shoots of wild-type tobacco, heat shock activated the processes diminishing **cytokinin** concentration, which are the typical **plant** response to heat shock. When such a response also manifests itself in transgenic **plants**, it can cause a transient **cytokinin** accumulation after heat shock treatment. 12 ref.

12/3,AB/112 (Item 12 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03164555 CAB Accession Number: 961600117
Agrobacterium-mediated transformation of the apple cultivar Granny Smith.
Trifonova, A.; Savova, D.; Ivanova, K.
Institute of Genetic Engineering, 2232 Kostinbrod, Bulgaria.
Progress in temperate fruit breeding. Proceedings of the Eucarpia Fruit Breeding Section Meeting, Wadenswil/Einsiedeln, Switzerland, 30 August to 3 September, 1993.
Conference Title: Progress in temperate fruit breeding. Proceedings of the Eucarpia Fruit Breeding Section Meeting, Wadenswil/Einsiedeln, Switzerland, 30 August to 3 September, 1993.
p.343-347
Publication Year: 1994
Editors: Schmidt, H.; Kellerhals, M.
Publisher: Kluwer Academic Publishers -- Dordrecht, Netherlands
ISBN: 0-7923-2947-3
Language: English
Document Type: Conference paper
An efficient adventitious shoot regeneration system from leaf segments of the apple cultivar Granny Smith was developed. Regenerants in sufficient frequency were obtained under the optimal conditions in presence of 3 mg BA, 2 mg 2iP and 0.2 mg NAA/litre. Putative transgenic **plants** were regenerated from leaf segments that were co-cultivated with disarmed C58 Agrobacterium tumefaciens strain containing either of the following binary plasmids: pGV2449 or pGV2492. The chimaeric marker gene for neomycin phosphotransferase II (nptII) and **ipt** genes (encoding for **isopentenyl transferase**, the first enzyme in the **cytokinin** biosynthetic pathway) were integrated in both plasmid derivatives. Seven putative transgenic **plants** were obtained on the selective medium containing 50 micro g/ml kanamycin after transformation with pGV2449. The **expression** and integration of nptII marker gene was detected in leaves of the **plants**. Rooting of the propagated **plants** was only achieved in presence of anticytokinin substance, 4-substituted-triazolo (4,5,d) pyrimidine and 0.5 mg IBA/litre. 11 ref.

12/3,AB/113 (Item 13 from file: 50)
DIALOG(R)File 50:CAB Abstracts

03060158 CAB Accession Number: 951608688
Cytokinin involvement in the control of coumarin accumulation in Nicotiana tabacum. Investigations with normal and transformed tissues carrying the **isopentenyl transferase** gene.
Hamdi, S.; Creche, J.; Garnier, F.; Mars, M.; Decendit, A.; Gaspar, T.; Rideau, M.
Laboratoire de Biologie Cellulaire et Biochime Vegetale, Faculte de Pharmacie, EA 1370, 37200 Tours, France.
Plant Physiology and Biochemistry (Paris) vol. 33 (3): p.283-288
Publication Year: 1995
ISSN: 0981-9428 --
Language: English

Document Type: Journal article
The effects of **cytokinins** on accumulation of the coumarin scopolin in tobacco tissues were investigated. Leaf discs were transformed with the Agrobacterium tumefaciens **ipt** gene under control of either its native promoter or a light-inducible (Rubisco (ribulose-bisphosphate carboxylase/oxygenase)) promoter. Several shoot cultures were isolated, from which **ipt** transgenic callus cultures were initiated. Leaves from all the **ipt** transgenic shoot cultures (grown in light) accumulated a high level of scopolin, whereas control (untransformed) leaves did not. Callus cultures carrying **ipt** under the control of its own promoter accumulated higher contents of scopolin as compared with untransformed calluses, irrespective of light or dark conditions. Dark-grown callus cultures carrying **ipt** under the control of the light-inducible promoter accumulated scopolin to levels comparable with untransformed calluses. Transferring transgenic calluses from dark to light, or adding a **cytokinin** to the culture medium resulted in an increase of the scopolin content. Exogenously applied **cytokinin** also increased the scopolin content of untransformed callus cultures. These data indicated that **cytokinins** control coumarin accumulation, and that enhanced levels of endogenous **cytokinins** could mimic the effect of exogenous **cytokinins** on coumarin pathway in tobacco tissues. 27 ref.

12/3,AB/114 (Item 14 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02924669 CAB Accession Number: 941610347
Cytokinin accumulation and action: biochemical, genetic, and molecular approaches.
Binns, A. N.
Plant Science Institute, Department of Biology, University of Pennsylvania, Philadelphia, PA 19104-6018, USA.
Annual Review of Plant Physiology and Plant Molecular Biology vol. 45 p.173-196
Publication Year: 1994
ISSN: 1040-2519 --
Language: English
Document Type: Journal article
Progress in identifying the genes and gene products involved in **cytokinin** control of growth and development is reviewed. Biochemical approaches are considered under the headings **cytokinin** biosynthesis, **cytokinin** metabolism and **cytokinin** receptors. Genetic approaches to the study of **cytokinins** have made use of **cytokinin** accumulation mutants and **cytokinin** response mutants. The molecular approaches discussed include those used in the study of **cytokinin** control of gene **expression** and transgenic **plants expressing** the **ipt** gene (encoding isopentenyltransferase) from Agrobacterium tumefaciens. 134 ref.

12/3,AB/115 (Item 15 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02899052 CAB Accession Number: 941609077
Genetic transformation of some poplar clones.
Original Title: Transformarea gentica a unor clone de plop.
Ionita, L.
Institutul de Cercetari si Amenajari Silvice, 72902 Bucharest, Romania.
Probleme de Genetica Teoretica si Aplicata vol. 25 (2): p.99-111
Publication Year: 1993 --
Language: Romanian Summary Language: english

Document Type: Journal article
The clones used were 717 1B4 (Populus tremula x P. alba (P. canescens)), Beaupre and Boelare (both P. trichocarpa x P. deltoides (P. interamericana)) and Ogy (P. deltoides x P. nigra (P. canadensis)). The genetic transformation was by coculture with Agrobacterium tumefaciens. Different vectors were tested. Clone 717 1B4 was successfully transformed using plasmid p35SASOM3C carrying the gene for O-methyltransferase (involved in lignin synthesis). The other 3 clones showed no regeneration when transformed with the same constructs. A cloning strategy was developed for the Tmr (**Ipt**) gene with the PRI-a promoter. This gene codes for an enzyme involved in the synthesis of **cytokinins** and when introduced into the **plant** genome conditions an acceleration of growth. Earlier tests involving transformation with this gene led to an abnormal development of transformed **plants**; hence the use in this case of an inducible promoter (PRI-a), which allows control of gene **expression** in the **plant**. 8 ref.

12/3,AB/116 (Item 16 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02898876 CAB Accession Number: 941608900
Morphometric analysis of the growth of Phsp 70-**ipt** transgenic tobacco **plants**.
Loven, K. van; Beinsberger, S. E. I.; Valcke, R. L. M.; Onckelen, H. A. van; Clijsters, H. M. M.
Limburgs Universitair Centrum (LUC), Department SBG, Universitaire Campus, 3590 Diepenbeek, Belgium.
Journal of Experimental Botany vol. 44 (268): p.1671-1678
Publication Year: 1993
ISSN: 0022-0957 --
Language: English
Document Type: Journal article
The effect of introducing a supplementary **ipt**-gene into the genome of Nicotiana tabacum cv. Petit Havana SR1 was studied. The **ipt**-gene, accounting for the biosynthesis of **cytokinins**, was coupled to the heat-inducible hsp70 promoter from Drosophila melanogaster. The influence of the hormonal changes involved was examined as well as the effects of the in vitro growth conditions used for selecting transformed **plants** and the heat treatment to induce **ipt**-gene **expression**. The phenotype of the **plants** was determined by the tissue sensitivity to three factors: (1) heat treatment reduces stem elongation and diameter growth; (2) in vitro pre-cultivation also reduces stem elongation; and (3) **expression** of the **ipt**-gene stimulates diameter growth, induces debudding in the axillary shoots and **inhibits** root development. In addition, axillary bud development indicates that in vitro cultivation, implying a stress condition, affects hsp70-**ipt** gene **expression** . 26 ref.

12/3,AB/117 (Item 17 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02898514 CAB Accession Number: 941608524
Attempts to elucidate the molecular mechanism of genetic tumors in Nicotiana.
Feng, X. H.; Kung, S. D.
Center for Agricultural Biotechnology and Department of Botany, University of Maryland, College Park, MD 20742, USA.
Institute of Botany, Academia Sinica Monograph Series (No. 13): p.35-46
Publication Year: 1993
ISSN: 0258-5170 --

Language: English
Document Type: Journal article
The tumorous amphidiploid hybrid (GGLL wild type) of N. glauca x N. langsdorffii, a non-tumorous mutant (GGLL mutant), and the parental species were used to study the molecular and physiological mechanisms underlying spontaneous genetic tumorigenesis. Endogenous levels of **cytokinins** in various tissues of all 4 genotypes were measured in immunoassays. Tumours contained relatively higher level of **cytokinin** than other tissues. The non-tumorous mutant exhibited a shooty morphology, indistinguishable from that of wild type genetic tumours, when it was treated by exogenously-applied **cytokinins** or transformed with an Agrobacterium tumefaciens Ti T-DNA gene (**ipt**) encoding isopentenyltransferase, an enzyme involved in the biosynthesis of **cytokinin** . This altered phenotype of the transformed mutant was caused by an elevation in the level of **cytokinin** resulting from the constitutive **expression** of the **ipt** gene. The spatial and temporal regulation of the Ng rol (N. glauca genomic genes homologous to the A. rhizogenes Ri rol genes) gene **expression** was also examined in genetic tumors. The **expression** of Ng rolC was higher in tumours than in normal tissues, suggesting that Ng rolC, which may have a similar function as Ri rolC to release free **cytokinins** from their conjugated forms, might play an important role in genetic tumour formation and/or maintenance. In conclusion, it seems that genetic tumours were caused, at least in part, by elevated levels of free **cytokinin** in interspecific hybrids. Furthermore, to identify other regulators of tumour induction and growth, PCR (polymerase chain reaction) was used to isolate protein kinase sequences from Nicotiana. RNA blot analyses showed that transcripts of 4 isolated kinase genes accumulated differentially during genetic tumour induction. Transcription of one protein kinase, named NIPK2, increased during tumour induction, while other kinase transcripts showed little change during the induction period. Thus, protein kinases may play a very critical regulatory role in **plant** hormone-mediated genetic tumorigenesis in Nicotiana. 64 ref.

12/3,AB/118 (Item 18 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02776801 CAB Accession Number: 931644425
Morphological characteristics and phytohormone content of **ipt** -transgenic tobacco.
Beinsberger, S. E.; Clijsters, H. M.; Valcke, R. L.; Onckelen, H. van
Department of SBM, Limburgs Universitait Centrum, 3590 Diepenbeek, Belgium.
Conference Title: Progress in plant growth regulation. Proceedings of the 14th International Conference on Plant Growth Substances, Amsterdam, Netherlands, 21-26 July 1991
p.738-745
Publication Year: 1992
Editors: Karssen, C. M.; Loon, L. C. van; Vreugdenhil, D.
Publisher: Kluwer Academic Publishers -- Dordrecht, Netherlands
ISBN: 0-7923-1617-7
Language: English
Document Type: Book chapter
Phytohormone content and morphological characteristics were analysed in **plant** material derived from Nicotiana tabacum cv. Petit Havana SR1 leaf discs transformed with the Agrobacterium tumefaciens T-DNA **ipt** gene using recombinant Ti-plasmids pGV2492 and pGV2488. Data on the **cytokinin** content and **cytokinin** : auxin ratio are provided for (1) transgenic calluses; (2) transgenic regenerants; (3) transgenic grafts (with transgenic shoots sandwiched in a vertical incision of a decapitated untransformed tobacco **plant**) and (4) transgenic seedlings. 7 ref.

12/3,AB/119 (Item 19 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02776478 CAB Accession Number: 931644084
Transgenic **plants** and transgenic **plant** mosaics for the **expression** of pathogen derived genes able to affect phytohormone activity.
Spena, A.; Estruch, J. J.; Aalen, R. D.; Prinsen, E.; Parets-Soler, A.; Nacken, W.; Sommer, H.; Chriqui, D.; Grossmann, K.; Onckelen, H. van; Schell, J.
Max-Planck-Institut fur Zuchtungsforschung, 5000 Koln 30, Germany.
Conference Title: Progress in plant growth regulation. Proceedings of the 14th International Conference on Plant Growth Substances, Amsterdam, Netherlands, 21-26 July 1991
p.724-730
Publication Year: 1992
Editors: Karssen, C. M.; Loon, L. C. van; Vreugdenhil, D.
Publisher: Kluwer Academic Publishers -- Dordrecht, Netherlands
ISBN: 0-7923-1617-7
Language: English
Document Type: Book chapter
Information on phytohormone activity in genetically engineered **plants** containing pathogen derived genes is collated on the basis of studies on (1) genetic mosaics for **cytokinin** synthesis (**ipt** gene from Agrobacterium tumefaciens), (2) genetic mosaic for the **expression** of the rolC gene of A. rhizogenes, (3) **plants** transgenic for the IAA lysine synthetase (iaaL) gene of Pseudomonas savastanoi, and (4) **plants** transgenic for tapetum specific **expression** of the rolB gene. Most studies were made with tobacco. 14 ref.

12/3,AB/120 (Item 20 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02762167 CAB Accession Number: 931642872
Modulation of chloroplast gene **expression** in transgenic **plants** of tobacco following changes in the phytohormone balance.
Yusibov, V. M.; Pak Chun Ir; Andrianov, V. M.; Piruzyan, E. S.
Conference Title: 1 Vsesoyuznyi simpozium "Novye metody biotekhnologii rastenii", Pushchino, 20-22 noyabrya, 1991: Tezisy dokladov.
p.50-51, 152-153
Publication Year: 1991
Publisher: -- Pushchino, Russia
Language: English; Russian
Document Type: Miscellaneous
Transgenic **plants** of 2 types were produced: containing the Escherichia coli glucose-6-phosphate isomerase gene xyl and the **cytokinin** synthesis gene **ipt** from Agrobacterium tumefaciens Ti-plasmid T-DNA. Analysis of **plants** of both types showed an increase in the content of **cytokinins**. Northern blot hybridization, which was used to assess accumulation of mRNA of the rbcL gene coding for the large subunit of ribulose-bisphosphate carboxylase, showed an increased content of this mRNA both in the transgenic **plants** and after treatment with exogenous **cytokinin**. Changes in the content of mRNAs of some other chloroplast genes in the transgenic **plants** were studied, e.g. psbA, proB, several ndh genes and the gene for 23S rRNA.

12/3,AB/121 (Item 21 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02606870 CAB Accession Number: 921632055
Progress in **cytokinin** research.
Kaminek, M.
Institute of Experimental Botany, Czechoslovak Academy of Sciences, 16630 Prague 6, Czechoslovakia.
Trends in Biotechnology vol. 10 (5): p.159-164
Publication Year: 1992
ISSN: 0167-7799 --
Language: English
Document Type: Journal article
The subject is reviewed under the headings; biological effects of **cytokinins**, how **cytokinins** originate, tRNA as a source of free **cytokinins**, metabolism of **cytokinins** (**cytokinin** conjugates and **cytokinin** oxidase), production of **cytokinins** in transgenic **plants**, reducing the **cytokinin** content of **plant** cells, habituation, how **cytokinins** act in **plant** cells, production of secondary metabolites in transformed **plants**, and outlook for the future. The potential is highlighted for using **cytokinin** genes in transgenic **plants** to increase yield by **expression** post anthesis. The Agrobacterium tumefaciens **ipt** gene has been **expressed** in transgenic tobacco and Arabidopsis **plants** in response to stimulation of a heat shock promoter. Antisense **ipt** genes might be used to reduce levels of **cytokinin** relative to auxin, thus stimulating rooting and reduction of branching in some ornamental and forest trees. Key future targets are cloning the genes regulating **cytokinin** mobilization, degradation and inactivation, and **cytokinin** binding sites. 42 ref.

12/3,AB/122 (Item 22 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02518502 CAB Accession Number: 921627354
Delayed leaf senescence in tobacco **plants** transformed with tmr, a gene for **cytokinin** production in Agrobacterium.
Smart, C. M.; Scofield, S. R.; Bevan, M. W.; Dyer, T. A.
IPSR Cambridge Laboratory, John Innes Centre, Colney, Norwich NR4 7UH, UK.
Annual report, AFRC Institute of **Plant** Science Research, John Innes Institute and Sainsbury Laboratory, 1990.
p.30-32
Publication Year: 1991?
Publisher: IPSR & John Innes Institute -- Norwich, UK
Language: English
Document Type: Annual report
Cytokinin levels in **plants** can be controlled by activity of the enzyme **isopentenyl transferase**, which in A. tumefaciens is controlled by gene tmr. The bacterial promoter for tmr was replaced with a soyabean promoter which is activated by heating to 42 deg C thus enabling direct comparison of adjacent tissue. Following heat shock, transformed leaves remained green while surrounding untransformed tissue died. The level of **cytokinins** increased markedly after a 2 h heat shock and zeatin concentration was 15-20-fold higher in heat shocked tissue 4 h after heat shock. The amount of tmr mRNA detectable by Northern blot analysis remained up to 8 h after heat shock, but was considerably lower by 24 h after heat shock. 6 ref.

12/3,AB/123 (Item 23 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02340446 CAB Accession Number: 902303196
Full **expression** of chimeric T-DNA gene 4 constructions in tobacco tissues.
Beinsberger, S. E.; Rudelsheim, P.; Inze, D.; Lijsebettens, M. van; Greef, J. de; Onckelen, H. A. van
Dep. Biology, University of Antwerp, UIA, B-2610 Wilrijk, Belgium.
Archives Internationales de Physiologie et de Biochimie vol. 96 (1): p.PP 2
Publication Year: 1988 --
Language: English
Document Type: Conference paper; Journal article
This paper was presented at a meeting of the Belgian Association of **Plant** Physiology at Liege on 14th Nov. 1987. The Agrobacterium tumefaciens T-DNA gene 4 encodes for **isopentenyl-transferase** which catalyses the first step in **cytokinin** biosynthesis. Chimeric T-DNA gene 4 constructions incorporated in Nicotiana tabacum cv. Petit Havana SR1. in the pGV831 vector were mobilized in A. tumefaciens in the Ti-plasmid vector pGV2260. Since the pGV831 contained a selectable marker (Pnos-nptII) the transformed cells could be selected on a kanamycin-containing medium in presence of both auxins and **cytokinins** so that the activity of different chimeric genes in an identical genetic background could be compared. In the control line, which contained only the selectable marker, very low **cytokinin** amounts were observed. In tobacco calli containing the octopine (pTi C58)-, the nopaline (pTi B6S3) gene 4 coupled to its own non-light inducible promoter, as well as in calli transformed with the chimeric octopine gene 4 coupled to the Pnos promoter, an increase of the endogenous levels of both **cytokinins** and IAA was observed. Consequently all gene 4-containing tissues managed to survive on a phytohormone-deficient medium. Surprisingly low endogenous **cytokinin** levels were found in light-grown calli containing a chimeric gene 4 construct coupled to the light-inducible Pssu promoter. Growth experiments on phytohormone-deficient media, however, showed that in the light some of the Pssu-gene 4 lines survived whereas in the dark the same lines turned brown and died. 6 ref.

12/3,AB/124 (Item 24 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02335370 CAB Accession Number: 901617500
Dual promoter of Agrobacterium tumefaciens mannopine synthase genes is regulated by **plant** growth hormones.
Langridge, W. H. R.; Fitzgerald, K. J.; Koncz, C.; Schell, J.; Szalay, A. A.
Plant Molecular Genetics, University of Alberta, Medical Sciences Building, Edmonton, AB T6G 2P5, Canada.
Proceedings of the National Academy of Sciences of the United States of America vol. 86 (9): p.3219-3223
Publication Year: 1989
ISSN: 0027-8424 --
Language: English
Document Type: Journal article
Temporal and spatial distribution of mannopine synthase (mas) promoter activity was determined throughout the development of transgenic tobacco **plants** using bacterial luciferase luxA and luxB as reporter genes. Luciferase activity was determined by luminometry in vitro and visualized by computer-enhanced single-photon video imaging in vivo. The activity of the mas dual promoters increased basipetally in developing **plants** and was wound-inducible in leaf and stem tissue. Hormone bioassays with isolated **plant** tissues and tumours deficient in the transferred DNA (T-DNA)-encoded genes iaaM, iaaH and **ipt** indicated that activity of

the mas dual promoters is regulated by auxin and enhanced by **cytokinin** in both differentiated and tumorous **plant** cells. 33 ref.

12/3,AB/125 (Item 25 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02309237 CAB Accession Number: 901615588
Agrobacterium-mediated transformation of the cultivated strawberry (Fragaria x ananassa Duch.) using disarmed binary vectors.
James, D. J.; Passey, A. J.; Barbara, D. J.
Institute of Horticultural Research, East Malling, Maidstone, Kent, ME19 6BJ, UK.
Plant Science (Limerick) vol. 69 (1): p.79-94
Publication Year: 1990
ISSN: 0168-9452 --
Language: English
Document Type: Journal article
Two disarmed Ti-binary vectors of A. tumefaciens were used to produce viable transgenic strawberry **plants**. Fertile strawberry **plants** with a normal phenotype were regenerated after transformation with pBIN6, which carries genes for nopaline synthase (nos) and neomycin phosphotransferase (nptII) (conferring kanamycin resistance). The transfer and **expression** of the 2 genes was confirmed by Southern blot analysis, the detection of nopaline synthase activity in vegetative and reproductive tissues and rooting in vitro in the presence of kanamycin. The nos gene continued to be **expressed** in greenhouse-grown **plants** many months after removal from in vitro growth conditions. After selfing the R0 **plants** , nos segregated in the R1 progeny according to a 3 : 1 Mendelian ratio. In in vitro germinated seedlings there was complete correlation between the presence of nopaline synthase activity and the ability of leaf segments to produce callus on a medium containing kanamycin. Transgenic clones that exhibited an abnormal phenotype associated with **cytokinin** overproduction were produced when **plants** were transformed with pSS1, a derivative of pBIN19 carrying both nptII and **ipt** (encoding isopentenyltransferase). Shoots of these clones grew on hormone-free medium, could not be induced to root and their growth was unaffected by the presence of 50 micro g/ml kanamycin in hormone-free media. 36 ref.

12/3,AB/126 (Item 26 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02271501 CAB Accession Number: 901145882
Agrobacterium tumefaciens 6b genes are strain-specific and affect the activity of auxin as well as **cytokinin** genes.
Tinland, B.; Huss, B.; Paulus, F.; Bonnard, G.; Otten, L.
Institut de Biologie Moleculaire des Plantes du CNRS, Rue de General Zimmer 12, 67084 Strasbourg, France.
Molecular and General Genetics vol. 219 (1-2): p.217-224
Publication Year: 1989
ISSN: 0026-8925 --
Language: English
Document Type: Journal article
The T-region located 6b gene of A. tumefaciens was found to interfere with **cytokinin** effects produced by the contransferred **ipt** gene. The biological activity of 3 different 6b genes were compared: A-6b from Ach5 (octopine biotype I), C-6b from C58 (nopaline, biotype I) and T-6b from Tm4 (octopine, biotype III). Each 6b gene was inserted into a disarmed vector and tested on tobacco stems in co-infection experiments

with the Ach5 **cytokinin** (**ipt**) gene (A-**ipt**). A-**ipt** /C-6b co-infections produced tumours with shoots, A-**ipt** /A-6b co-infections green tumours and A-**ipt**/T-6b co-infections tumours with a necrotic surface. The tumour phenotypes obtained were independent of the 6b/A-**ipt** co-infection ratios, indicating that the str.-specific 6b effects result from the activity of a non-diffusible 6b encoded product. Studies with **ipt**-less Tm4 mutants showed that 6b genes affect other tumour genes besides the **ipt** gene and pointed to an influence of T-6b on auxin effects resulting from the Tm4 iaa system. T-iaa/T-6b co-infection experiments showed that T-6b did indeed strongly increase tumour formation by the Tm4 iaa genes. The 3 6b genes also have effects which do not require other T-region genes. The complex role of the 6b gene in crown gall induction and Agrobacterium host range is discussed. 37 ref.

12/3,AB/127 (Item 27 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02235060 CAB Accession Number: 901175516
Nucleotide sequence, evolutionary origin and biological role of a rearranged **cytokinin** gene isolated from a wide host range biotype III Agrobacterium strain.
Bonnard, G.; Tinland, B.; Paulus, F.; Szegedi, E.; Otten, L.
Institut de Biologie Moleculaire des Plantes du CNRS, Rue de General Zimmer 12, 67000 Strasbourg, France.
Molecular and General Genetics vol. 216 (2-3): p.428-438
Publication Year: 1989
ISSN: 0026-8925 --
Language: English
Document Type: Journal article
A DNA fragment with homology to the **cytokinin** (**ipt**) gene from biotype I A. tumefaciens str. Ach5 was cloned from the Ti plasmid of the wide host range biotype III A. str. Tm- 4 and sequenced. The fragment contains an intact **ipt** coding sequence. However, the 3' non-coding region of this **ipt** gene is rearranged due to a 0.9 kb deletion fusing it to the 3' coding region of the neighbouring gene 6a, most of which was found to be deleted. The Tm-4 **ipt** gene is strongly related to the partially deleted **ipt** gene of the limited host range biotype III str Ag162. To test its biological activity, the Tm-4 **ipt** gene was inserted into a specially constructed, disarmed Ti vector lacking tzs and tested on tobacco, where the rearranged **ipt** gene induced shoot formation. The cloned Tm-4 **ipt** gene was mutated with Tn5 and the intact gene on the wild-type Tm-4 Ti plasmid was replaced by the mutated gene. The resulting str. was avirulent on tobacco but normally virulent on the natural host of the wild-type str. Tm-4, grapevine. As the biotype I 6b gene diminishes the effect of a corresponding **ipt** gene, a larger Tm-4 fragment carrying both the **ipt** gene and an adjacent 6b-like gene was also tested on tobacco and compared with the Tm-4 **ipt** fragment alone and with an **ipt** and 6b/**ipt** fragment derived from Ach5. The Tm-4 6b gene diminishes the effect of the Tm-4 **ipt** gene, showing the Tm-4 6b gene to be active as well. The Tm-4 6b/**ipt** combination is less effective than the Ach5 combination. These results provide further insight into the molecular basis of the host range differences between limited host range and wide host range biotype III A. strs and show that the WHR **cytokinin** gene, although active, does not significantly contribute to tumour formation on grapes, the natural host of the WHR biotype III strs. 57 ref.

12/3,AB/128 (Item 28 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02147694 CAB Accession Number: 891607282
Construction of a heat-inducible chimaeric gene to increase the **cytokinin** content in transgenic **plant** tissue.
Schmulling, T.; Beinsberger, S.; Greef, J. de; Schell, J.; Onckelen, H. van; Spena, A.
MPI fur Zuchtungsforschung, 5000 Koln 30, German Federal Republic.
FEBS Letters vol. 249 (2): p.401-406
Publication Year: 1989
ISSN: 0014-5793 --
Language: English
Document Type: Journal article
The **ipt** gene of Agrobacterium tumefaciens T-DNA encodes an isopentenyltransferase which causes **cytokinin** overproduction and developmental alterations in transformed **plants**. A chimaeric gene, constructed by positioning the **ipt** coding region under the control of the hsp70 gene from Drosophila melanogaster, allowed heat-regulated **expression** in transgenic **plant** tissue. Heat-shock treatment of tobacco calluses transgenic for the chimaeric hsipt gene increased the endogenous **cytokinin** concentration and enabled the calluses to grow on **cytokinin**-free medium. Transgenic **plants** regenerated from calluses transformed with the hsipt gene and grown at normal temperatue were phenotypically normal. 21 ref.

12/3,AB/129 (Item 29 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02100200 CAB Accession Number: 891126000
Hormones and the molecular basis of determination in **plants**.
Meins, F, Jr.
Friedrich Miescher-Inst., CH-4002 Basle, Switzerland.
Monograph, British Plant Growth Regulator Group (No. 16): p.19-28
Publication Year: 1987 --
Language: English
Document Type: Journal article
Studies of variation in the **cytokinin** requirement of cultured tobacco tissues show that **plant** cells can undergo potentially reversible, cell-heritable changes in phenotypic **expression**. The **cytokinin** -autotrophic state appeared to be stabilized by a positive-feedback loop in which **cytokinins** or similar cell-division factors induced their own biosynthesis. The **cytokinin** requirement of cultured tobacco cells was regulated at two genetic loci, Hl-1 and Hl-2. The Hl-1 locus could be activated by mutation to have an oncogenic function similar to the **isopentenyl transferase** locus of the tumour-inducing Ti plasmid. 22 ref.

12/3,AB/130 (Item 30 from file: 50)
DIALOG(R)File 50:CAB Abstracts

02016733 CAB Accession Number: 881673565
Cytokinin gene fused with a strong promoter enhances shoot organogenesis and zeatin levels in transformed **plant** cells.
Smigocki, A. C.; Owens, L. D.
Tissue Culture & Molec. Biol. Lab., ARS, USDA, Beltsville, MD 20705, USA.
Proceedings of the National Academy of Sciences of the United States of America vol. 85 (14): p.5131-5135
Publication Year: 1988
ISSN: 0027-8424 --
Language: English

Document Type: Journal article
The isopentenyltransferase (**ipt**) gene associated with **cytokinin** biosynthesis in **plants** was cloned from a tumour-inducing plasmid carried by Agrobacterium tumefaciens and placed under the control of promoters of differing activities, the cauliflower mosaic virus 35S promoter and the nopaline synthase promoter. These promoter-gene constructs were introduced into wounded Nicotiana (N. tabacum, N. rustica and N. plumbaginifolia) stems and leaf pieces and cucumber seedlings by A. tumefaciens infection. Shoots were observed at the infection site on all Nicotiana **plants** (except those of N. rustica) infected with the 35S promoter construct (35S-**ipt**), whereas only 41% responded similarly to infection with the unmodified gene. Furthermore, shoots were observed 19 days after infection with the 35S-**ipt** and were up to 6 times taller than shoots induced by the native gene. On cucumber, shoots were observed only on galls incited by the 35S-**ipt** construct. These galls were, on average, 7.5 times larger than those incited by the nopaline synthase promoter construct (NOS-**ipt**) or the unmodified **ipt** gene. Zeatin and zeatinriboside concentrations, were on average, 23 times higher in 35S-**ipt** transformed shoots than in ones transformed with the native **ipt** gene. The results suggested that a more active promoter on the **ipt** gene can enhance or change the morphogenic potential of transformed **plant** cells by increasing their endogenous **cytokinin** levels.
41 ref.

12/3,AB/131 (Item 1 from file: 65)
DIALOG(R)File 65:Inside Conferences

02468009 INSIDE CONFERENCE ITEM ID: CN025771495
Expression of **IPT** Gene in Transgenic Arabidopsis **Plants** Leads to Ubnormal Accumulation of **Cytokinin** N-Glucosides
Werner, T.; Rupp, H. M.; Schmuelling, T.; Van Onckelen, H.
CONFERENCE: Plant physiology-Czech-Slovak conference; 8th (Eighth days of plant physiology)
P: 237
Palacky University, **1998**
ISBN: 8070678720
LANGUAGE: English DOCUMENT TYPE: Conference Abstracts
CONFERENCE LOCATION: Olomouc, Czech Republic
CONFERENCE DATE: Jul 1998 (199807) (199807)

12/3,AB/132 (Item 1 from file: 76)
DIALOG(R)File 76:Life Sciences Collection

01534198 2631378
Viviparous leaves produced by somatic activation of an inactive **cytokinin**-synthesizing gene.
Estruch, J.J.; Prinsen, F.; Van Onckelen, H.; Schell, J.; Spena, A.
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Tobacco **plants** that are somatic mosaics for **expression** of a **cytokinin**-synthesizing gene have viviparous leaves. Such a formation of shoots in an abnormal position represents a significant deviation from the usual organization of the **plant** body where a central axis produces shoots only in the axis of lateral leaf appendages and according to a precise phyllotactic pattern. This report links vivipary to the **expression** of a gene whose product is involved in the synthesis of